

# CAIS STANDARD MANUAL

## SYSTEM NO. 3 BUILDING EXTERIOR

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Scientific and Technical  
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**03 BUILDING EXTERIOR**

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## 03 BUILDING EXTERIOR

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### ABSTRACT

#### GENERAL ORGANIZATION

At this installation the list of facilities to be surveyed, including infrastructure, will be addressed on the basis of 32 unique systems that form the CAIS Engineering Deficiency Standards and Inspection Methods document. Each system deals with a specific technical aspect of the facility to be surveyed. Within each system a further breakdown is made to subsystems, each having a related list of components. Detailed observations of the listed defects are provided so as to allow the entry of observed quantification data. A DOD CAIS manual is provided for each of the 32 systems with an internal organization as outlined below:

#### INSPECTOR'S GUIDE

- I. General
  - A. Level I Inspection Method Description
  - B. Level II Inspection Method Description
  - C. Level III Inspection Method Description
- II. General Inspection
  - A. Process. This section describes the process of the inspection activity.
  - B. Location. This section describes the procedure for locating the inspection units in the facility or infrastructure on this installation.
- III. Inspector Qualifications

This section notes the minimum qualifications for the person or persons performing the survey.
- IV. Inspection Unit

This section describes how the IU (Inspection Unit) is determined for the particular component being surveyed.
- V. Unit Costs

This section notes the nature of repair costs for this system.
- VI. Standard Safety Requirements

This section lists safety procedures and equipment required to implement a safe environment for the conduct of this survey.
- VII. Standard Tools

This section lists a set of standard tools required for the general conduct of this survey.
- VIII. Special Tools and Equipment Requirements

This section refers to special tools or equipment requirements endemic to the nature of the system being surveyed.

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### IX. Level II Inspection Method Keys

This section explains the use of keys as they relate to Level II Guide Sheets.

### X. Level III Inspection Method Keys

This section explains the use of keys as they relate to Level III Guide Sheets.

### XI. Replacement Cost

This section describes the nature and location of replacement cost data.

### XII. Appendices

Appendix A. Provides a listing and definition of all abbreviations used both in the Standards and in the data base.

Appendix B. Provides a glossary of terms with their definitions as used in the Standard.

Appendix C. This section contains a listing of the average life cycle durations for each assembly\* in the Standard.

- \* Assembly is a term describing the level at which replacement rather than repair occurs. This can be at the subsystem or component designation, depending on the system being surveyed.

## SYSTEM TREE

The System Tree is a graphical representation of the Work Breakdown Structure, showing system, subsystem and component relationships for the Building Exterior System.

## INSPECTION METHODS

### Description

Describes the nature of what is to be condition surveyed.

### Special Tool and Equipment Requirements

Lists any special tools required for this specific subsystem.

### Special Safety Requirements

This section outlines any special safety measures or equipment required for this specific subsystem so as to maintain a safe environment and process in the conduct of the condition survey.

### Component List

All components to be surveyed under this subsystem are listed here.

### Related Subsystems

All other subsystems that have a survey relationship to this subsystem are listed here to help coordinate a complete and thorough condition assessment survey.

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### Standard Inspection Procedure

This statement indicates the various levels of survey effort required for this subsystem.

### Components

The previously listed components of this subsystem are described with a survey procedure recommended on a component by component basis. For each component there is a listing of defects with each defect broken down into observations describing the nature and severity of the defective condition observed. The surveyor enters a quantification value for each defect/observation encountered in the field CAIS device (DCD) to record the result of his survey.

### References

This page lists the reference sources from which the foregoing subsystem data was developed.

### Guide Sheet Control Number

This section lists the key numbers that tie the written Level II and Level III guide sheets to specific components in this subsystem.

### Level II and Level III Inspection Method Guide Sheets

This section contains the detailed descriptions of the Level II and III survey and inspection procedures for this subsystem.



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### INSPECTOR'S GUIDE

#### I. GENERAL

##### A. Level I Inspection Method

The Level I Inspection Method of building exterior consists of a thorough inspection of the building exterior. The survey activity is designed to be performed by a single surveyor.

##### B. Level II Inspection Method

Level II inspections are triggered by defect/observations noted at the Level I inspection or in some cases, are required to conduct a meaningful survey of the component being surveyed. There are several Level II inspections in Building Exterior. They occur typically where intrusive access to the component being surveyed is required. Level II inspections are referenced by defect/observations through a "Level II key", which denotes a specific Guide Sheet that describes the Level II inspection activity.

##### C. Level III Inspection Method

The Level III inspection is triggered by defect/observations occurring in the Level I and II inspections. The Level III inspection can also occur as a result of time based scheduling, antidotal experience, or component age compared to its life cycle. The Level III inspection is referenced through a Level III key which in turn, denotes a specific Guide Sheet describing the Level III inspection process and requirements. Level III inspections produce a detailed, written engineering assessment of the deficiency along with an estimated cost of correction, and are performed at the option of the Facility Manager.

#### II. GENERAL INSPECTION

##### A. Process

Surveys are normally conducted at the component level. Figure 03-A provides the breakdown from system through component for the Building Exterior. The surveyor will work through the Work Breakdown Structure (WBS) to conduct the inspection. At the component level the surveyor will be provided a list of defects, each of which is described further in detail as observations. These observations are described to various levels of severity as they relate to the effect of the life of the system. The quantification of each deficiency is identified by the surveyor using the associated unit of measure. Once an observation is populated with a deficient quantity, the inspector will be requested to provide information on the component type and location. The installation date or age of the component may be preloaded into the WBS for each asset from the Real Property Inventory List or site specific information. In the case of Building Exterior this will take the form of facility plans (elevations) showing type and size. If necessary age data can be overridden by the surveyor, Site CAIS personnel, or the Facility Manager.

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### B. Location

Level I and II inspections will be located by the surveyor through a discrete entry in the Field CAIS. The "IU", (Inspection Unit) will be derived from Facility plans and room numbering lists, or other I.D. numbering systems. In all cases plans shall be orientated with the top of each sheet being the north direction, so as to allow directional location and description. In the case where no other means of location exist the inspector shall enter a brief (65 character) description of location. Locations must be accurate to insure future repeatability and consistent results.

Special care should be taken by the inspector in locating the IU for Exterior Windows and Doors. Windows in particular present a unique challenge since they may be located from either the exterior or interior of the facility. Since they should be examined from both vantage points, the inspector should enter the initial location data into Field CAIS and then **edit** the IU upon inspecting the window from the second vantage point. This will ensure that all of the data pertaining to the window is attached to the correct IU.

### III. INSPECTOR QUALIFICATIONS

The minimum inspector qualification for Building Exterior requires a five year journeyman. Experience or familiarity in the areas of masonry, wood and other constructions requiring primarily carpentry skills is desirable but not required. All of the condition survey requirements for this system can be accomplished at the Level I inspection by a single inspector, however, safety and other considerations may require that inspectors work in teams. Inspectors will be specifically trained in the CAS system and its usage and will be CAS certified in the "Civil" discipline.

### IV. INSPECTION UNIT (IU)

The Inspection Unit is normally defined at the component level for this system. If the unit of measure is each the IU is each. In the case of a unit of measure that is square feet, or linear feet the IU is determined by the identification of its location, such as areas of wall, etc. IU's may include one occurrence of each component or multiple occurrence of a single component (e.g. multiple windows occur in a wall section). Defect quantities are captured by the inspector for each occurrence with the discrete component, (defect quantities are tied to each wall section as a unique component, but the component wall may have only one discrete unit since it is a contiguous area.)

If the inspector finds multiple defects that occur in the same wall, the inspector will quantify the observation that is considered most severe and identify the remaining quantity under the less severe observation for the discrete component.

IU's for the Building Exterior System are measured in square feet (SF), linear feet (LF) or by individual occurrences (EA). The boundaries of each IU will be defined by some man-made break in the continuity of the material being inspected (exterior walls) or by the occurrence or presence of the item (doors and windows). The following list describes some typical examples:

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## 03 BUILDING EXTERIOR

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Exterior Walls - Exterior walls are defined in square feet (SF). The IU is defined as the contiguous area of the wall which possess the same material, age, repair and construction characteristics. At a minimum, each "side" of the facility (defined by building corners or changes in wall direction) should define a unique IU. If the type of construction, material, age, or level of maintenance varies across the contiguous wall, it should be broken into separate IU's based on consistent materials, age, etc.

Exterior Wall Sealant/Caulking is defined in linear feet (LF). The IU is defined as a contiguous area of use. Typically, the inspector should translate this to mean "the total quantity of caulking/sealant for present on the exterior wall". Each wall would, therefore, be identified as a unique caulking IU located by the same nomenclature used to the wall and quantified in linear feet (LF).

Exterior Doors and Windows are quantified at both the subsystem and component level. In the case of doors and windows, the inspector is prompted to select a "Type" for each door or window assembly (door/window, frame, finish, caulking, hardware) based on the subsystems physical characteristics, prior to identifying and quantifying the IU. The IU is still defined at the component level in terms of square feet (SF), linear feet (LF) or each (EA) depending on the nature of the component. Doors and windows are typically quantified in SF, frames and caulking in LF, and hardware in EA.

Special care should be taken in locating exterior door and window IU's since they may be located either from the interior (floor and room number) or exterior ("3rd window from left, South side, Second floor"). Both of these location descriptions may refer to the same IU. While inspectors may begin with either the inside or outside of the doors and windows, they should take care to inspect from both vantage points. As the inspector evaluates the IU from the second vantage point, he/she should be careful to **edit** the existing IU for the door or window under inspection, by modifying the location information and adding any additional defect/observations noted from the second vantage point. This is of particular importance in the case of exterior windows where the exterior and interior views are difficult to accomplish simultaneously. **Due to the unusual nature of the exterior inspection for windows, multiple inspectors for the same facility are not recommended.**

Exterior Specialties utilize both each (EA) and square feet (SF) to quantify the size of the IU. Louvers, grilles, screens, vents, soffit/facia and flashing are all quantified in SF. Each individual Louver, grille, screen or vent should be identified as a separate IU and quantified based on its total size. Soffit/facia and flashing should be defined based on contiguous occurrences (all of the soffit for the East side of the building).

Architectural Features are defined as each (EA) and may include exterior decorative ornaments and similar non-structural items unrelated to the envelope of the building. Each occurrence should be defined as an individual IU.

### V. UNIT COSTS

The unit costs that are applied to the quantities recorded for each observation are contained within the Site CAIS as repair cost.

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## 03 BUILDING EXTERIOR

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### VI. STANDARD SAFETY REQUIREMENTS

The Master Safety Plan will be followed at all times during the condition survey.

Inspector may utilize the following protective gear:

- Hard hat - to be worn during all surveys
- Safety glasses - to be worn during all surveys
- Safety shoes - to be worn during all surveys
- Coveralls - to be worn as necessary
- Gloves - to be worn as necessary
- Ear plugs - to be worn in designated areas
- Knee pads - to be worn when crawling is required
- Rain suit - to be worn as necessary
- Wet suit - to be worn as necessary

### VII. STANDARD TOOLS

Employee Identification Card - to be worn or carried during all survey activities  
Data Collection Device (DCD)  
Battery pack for DCD  
Flashlight  
Tape measure - 30'  
Rule - 6'  
Tool bag  
Screwdrivers -  
    Phillips  
    Straight slot  
Knife  
Pliers  
Binoculars (7x30)  
8' Extension Ladder

### VIII. SPECIAL TOOLS AND EQUIPMENT REQUIREMENTS

At the subsystem level, the deficiency standard has identified special tools and equipment required for the standard inspection of the associated components, which exceed the standard tools identified for the system. Level III Inspection Method Guide Sheets will address additional tools and equipment requirements that are specific to that particular advanced method of inspection.

Facility Managers should review these sections in order to determine any special tool requirements for subsystems they are to inspect/survey.

### IX. LEVEL II INSPECTION METHOD KEYS

Certain observations will reference a Level II Inspection Method. The Facility Manager will be able to identify deficiencies where a Level II inspection is flagged. The Level II key at the observation level will refer to a specific guide sheet.

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All Level II Guide Sheets are located at the end of each Subsystem section. A Guide Sheet Reference page precedes Level II and Level III Guide Sheets.

### X. LEVEL III INSPECTION METHOD KEYS

Certain observations will trigger a Level III inspection. The Facility Manager will be able to identify deficiencies where a Level III inspection is flagged. The Level III Key at the observation level will refer to a specific guide sheet. These guide sheets may refer the Facility Manager to a more sophisticated and costly test method.

All Level III Guide Sheets are located at the end of each Subsystem section. A Guide Sheet Reference page precedes Level II and Level III Guide Sheets.

### XI. REPLACEMENT COST

A replacement cost for each subsystem type will be contained within the cost estimating system in the Site CAIS.

### XII. APPENDICES

#### Appendix A - Abbreviations

A summary and definition of all abbreviations used in this system are contained in Appendix A which is located at the end of Building Exterior.

#### Appendix B - Glossary

A glossary of terms used in this system are contained in Appendix B which is located at the end of Building Exterior.

#### Appendix C - Life Cycles

A listing of the average life cycle durations for each assembly\* in the Standard.

#### Note - Facility Manager's Guide

The following are included in the Facility Manager's Guide:

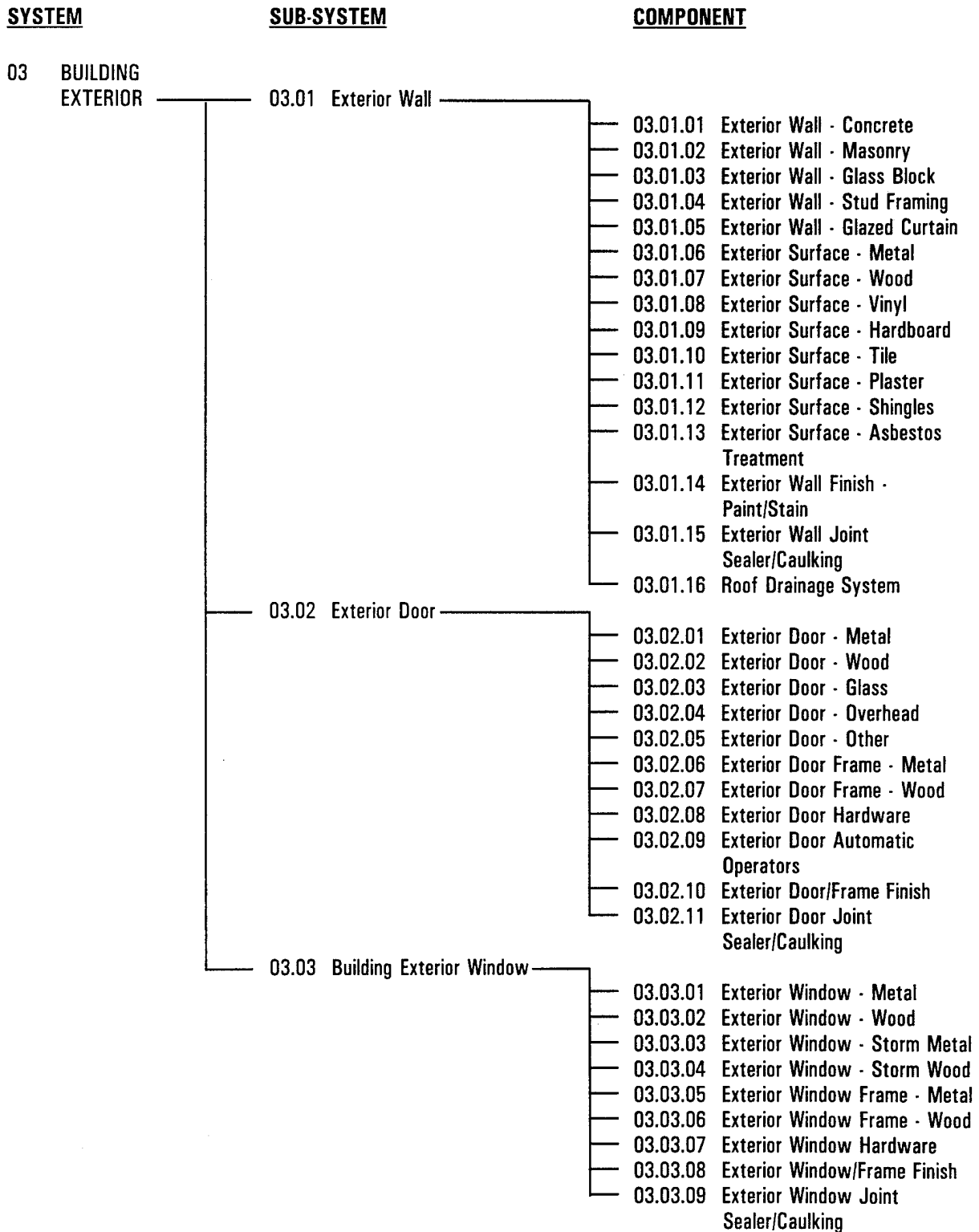
A table showing the required manhours to perform the standard inspection for this facility listed by Cat Code (three digit).

A listing of all Level III inspections with their estimated cost and time to perform. This list will include frequency of inspection for time driven Level III's.

\* Assembly is a term describing the level at which replacement rather than repair occurs. This can be at the subsystem or component designation, depending on the system being surveyed.

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**Figure 03-A. WORK BREAKDOWN STRUCTURE**



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**03 BUILDING EXTERIOR**

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**Figure 03-A. WORK BREAKDOWN STRUCTURE (Continued)**

<u>SYSTEM</u>	<u>SUB-SYSTEM</u>	<u>COMPONENT</u>
03 BUILDING EXTERIOR (Continued)	03.04 Building Exterior Specialties	03.04.01 Louver/Grille/Screen/Vents 03.04.02 Soffit/Facia 03.04.03 Flashing 03.04.04 Architectural Features 03.04.05 Lintels

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## 03.01 EXTERIOR WALL

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### DESCRIPTION

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Exterior walls are any outside wall or vertical enclosure of a building. Walls are a subsystem of the Building Exterior system. Primary function of walls is to encase the building and protect it from the weather, and carry live and dead loads. The walls also serve as a security, thermal, and acoustical barrier and provide fire resistance. In cases where the building is sided or similarly covered, the inspector will utilize the components which are readily inspectable through the standard inspection process. Concrete or masonry or wood will not be inspected when it is covered by plaster, vinyl siding or similar materials.

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### SPECIAL TOOL AND EQUIPMENT REQUIREMENTS

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No special tools are needed for the inspection of the walls, beyond the requirements listed in the Building Exterior Standard Tools Section.

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### SPECIAL SAFETY REQUIREMENTS

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No special safety requirements are needed for the inspection of the walls, beyond the requirements listed in the Master Safety Plan and System Safety Section.

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### COMPONENT LIST

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- ◆ 03.01.01 EXTERIOR WALL - CONCRETE
- ◆ 03.01.02 EXTERIOR WALL - MASONRY
- ◆ 03.01.03 EXTERIOR WALL - GLASS BLOCK
- ◆ 03.01.04 EXTERIOR WALL - STUD FRAMING
- ◆ 03.01.05 EXTERIOR WALL - GLAZED CURTAIN
- ◆ 03.01.06 EXTERIOR SURFACE - METAL
- ◆ 03.01.07 EXTERIOR SURFACE - WOOD
- ◆ 03.01.08 EXTERIOR SURFACE - VINYL
- ◆ 03.01.09 EXTERIOR SURFACE - HARDBOARD
- ◆ 03.01.10 EXTERIOR SURFACE - TILE
- ◆ 03.01.11 EXTERIOR SURFACE - PLASTER
- ◆ 03.01.12 EXTERIOR SURFACE - SHINGLES
- ◆ 03.01.13 EXTERIOR SURFACE - ASBESTOS TREATMENT
- ◆ 03.01.14 EXTERIOR WALL FINISH - PAINT/STAIN
- ◆ 03.01.15 EXTERIOR WALL SEALANT/CAULKING
- ◆ 03.01.16 ROOF DRAINAGE SYSTEM



## 03.01 EXTERIOR WALL

### RELATED SUBSYSTEMS

Due to the related nature of the elements requiring inspection, the following DS/IM's should be reviewed for concurrent inspection activities.

01	BUILDING SUBSTRUCTURE (all subsystems)
02	BUILDING SUPERSTRUCTURE (all subsystems)
03.02	EXTERIOR DOOR
03.03	EXTERIOR WINDOW
04	BUILDING ROOFING (all subsystems)

### STANDARD INSPECTION PROCEDURE

The standard inspection procedure for this subsystem is a visual inspection of each exterior wall, augmented by a Level II Inspection when required. Very few Level II or III inspection keys are indicated for the Building Exterior Wall subsystem. Some inspections may require the inspector to utilize a ladder or similar device to observe defect/observations above the inspectors normal line of sight. The inspection should be carried out in order of presentation of the various components. Associated defects and observations are listed which will be presented in the inspector's Data Collection Device (DCD).

### COMPONENTS

#### ◆ 03.01.01 EXTERIOR WALL - CONCRETE

Concrete walls may serve as the structural component of a building, and may be textured to provide a desired appearance. Concrete is a mixture of aggregates, cement, and water, which when mixed together produce a strong, weather-resistant, durable, long-lasting wall. Concrete walls also incorporate reinforcing steel to improve the structural properties of the wall.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<p><b>* Surface Damage:</b>            (caused by impact damage, previous maintenance patching, water intrusion, spalling, cracking, deterioration, building settlement etc.)            Observation:</p>			
<p>a. Surface damage evidenced by scratches or hairline cracks to wall surface.</p>	SF		
<p>*** {Severity L}</p>			

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## 03.01 EXTERIOR WALL

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### COMPONENTS (Continued)

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#### ◆ 03.01.01 EXTERIOR WALL - CONCRETE (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Surface Damage (Continued):</b>			
b. Surface damage evidenced by stains, efflorescence, graffiti on wall surface.	SF		
*** {Severity L}			
c. Surface material damage evidenced by spalling, cracks, or chips in wall surface.	SF		
*** {Severity M}			
d. Surface material damage evidenced by holes, cracks, spalling, or fault which allows air or moisture to penetrate the wall.	SF	1	
*** {Severity H}			

#### Defect:

<b>* Misalignment:</b>			
(caused by impact damage, building settlement, etc.)			
Observation:			
a. Noticeable misalignment evidenced by joint separation, compression or other component distress.	SF	1	
*** {Severity M}			
b. Noticeable misalignment evidenced by failure of anchor or attachment devices, presenting unsafe condition.	SF	1	1
*** {Severity H}			

## 03.01 EXTERIOR WALL

### COMPONENTS (Continued)

#### ♦ 03.01.02 EXTERIOR WALL - MASONRY

Masonry is a combination of small building units made of clay, shale, concrete, gypsum, or stone that are set in mortar. Mortar is the binding agent which holds masonry units together. Mortar is made up of sand, lime, cement, and water. Color can be added to match the masonry units. Some masonry walls incorporate other building materials within their hollow cores and mortar joints. These materials include ties, grout, reinforcing steel, insulation, and electrical/mechanical components.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Masonry Unit Surface Damage:</b> (caused by impact damage, previous maintenance patching, water intrusion, deterioration, building settlement etc.) Observation:			
a. Surface damage evidenced by scratches or hairline cracks to wall surface.	SF		
*** {Severity L}			
b. Surface damage evidenced by stains, efflorescence, graffiti on wall surface.	SF		
*** {Severity L}			
c. Surface material damage evidenced by spalling, cracks, or chips in wall surface.	SF		
*** {Severity M}			
d. Surface material damage evidenced by holes, cracks, spalling, or fault which allows air or moisture to penetrate the wall.	SF	2	
*** {Severity H}			

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## 03.01 EXTERIOR WALL

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### COMPONENTS (Continued)

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#### ◆ 03.01.02 EXTERIOR WALL - MASONRY (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Misalignment:</b> (caused by impact damage, building settlement, etc.) Observation:			
a. Noticeable misalignment evidenced by joint separation, compression or other component distress.	SF	2	
*** {Severity M}			
b. Noticeable misalignment evidenced by failure of anchor or attachment devices, presenting unsafe condition.	SF	2	2
*** {Severity H}			

#### Defect:

* <b>Mortar Deterioration:</b> (caused by weathering, building settlement, etc.) Observation:			
a. Mortar deterioration evidenced by hairline cracks or soft joints.	SF		
*** {Severity M}			
b. Mortar deterioration evidenced by cracks, loose or missing mortar.	SF		
*** {Severity H}			

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## 03.01 EXTERIOR WALL

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### COMPONENTS (Continued)

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#### ◆ 03.01.03 EXTERIOR WALL - GLASS BLOCK

Glass block, which was a popular building material in the early 1900's, has recently undergone a revival in the building industry, particularly for exterior walls. Glass block offers the advantages of excellent light diffusion, and good thermal insulation, and also comes in various decorative styles.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Glass Block Unit Surface Damage:</b> (caused by impact damage, previous maintenance patching, water intrusion, deterioration, building settlement etc.) Observation:			
a. Surface damage evidenced by scratches or hairline cracks to the block surface. *** {Severity L}	SF		
b. Surface damage evidenced by stains, efflorescence, graffiti on block surface. *** {Severity L}	SF		
c. Surface material damage evidenced by cracks, or chips in block surface. *** {Severity M}	SF		
d. Surface material damage evidenced by holes, cracks, or fault which allows air or moisture to penetrate the block. *** {Severity H}	SF	3	

#### Defect:

* <b>Misalignment:</b> (caused by impact damage, building settlement, etc.) Observation:			
a. Noticeable misalignment evidenced by joint separation, compression or other component distress. *** {Severity M}	SF	3	

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**03.01 EXTERIOR WALL**

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**COMPONENTS (Continued)**

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**♦ 03.01.03 EXTERIOR WALL - GLASS BLOCK (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Misalignment (Continued):</b>			
b. Noticeable misalignment evidenced by failure of anchor or attachment devices, presenting unsafe condition. *** {Severity H}	SF	3	3

**Defect:****\* Mortar Deterioration:**

(caused by weathering, building settlement, etc.)

Observation:

- |  |    |
|--|----|
| a. Mortar deterioration evidenced by hairline cracks or soft joints.<br>*** {Severity M} | SF |
| b. Mortar deterioration evidenced by cracks, loose or missing.<br>*** {Severity H}       | SF |

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## 03.01 EXTERIOR WALL

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### COMPONENTS (Continued)

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#### ◆ 03.01.04 EXTERIOR WALL - STUD FRAMING

Stud framing systems include assembling of vertical and horizontal members to form the exterior wall of the structure. Stud frame walls may be sheathed with wood boards, plywood, fiber or gypsum boards, which provide rigidity, form a weather barrier, and may be necessary as a nailing base to receive exterior finishes.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Sheathing Damage:</b> (caused by impact damage, previous maintenance patching, insect/animal damage, water intrusion, etc.) Observation:			
a. Surface material damage evidenced by holes or cracks in sheathing.	SF	4	
*** {Severity H}			
<b>Defect:</b> <b>* Misalignment:</b> (caused by impact damage, building settlement, etc.) Observation:			
a. Noticeable misalignment evidenced by joint separation, compression or other component distress.	SF	4	
*** {Severity M}			
b. Noticeable misalignment evidenced by failure of anchor or attachment devices, presenting unsafe condition.	SF	4	4
*** {Severity H}			

## 03.01 EXTERIOR WALL

### COMPONENTS (Continued)

#### ◆ 03.01.05 EXTERIOR WALL - GLAZED CURTAIN

A curtain wall is an exterior building wall that carries no roof or floor loads; it is fastened to the structural frame and acts solely as an enclosing envelope. It usually consists of metals in combination with glass, plastics, and other surfacing materials. The function of a curtain wall is to encase the building and protect it from the elements of the natural environment.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* Metal Panel Surface Damage: (caused by impact damage, etc.) Observation:			
a. Surface damage evidenced by mares, scratches, or scuffs on wall surface. *** {Severity L}	SF		
b. Surface material damage evidenced by dents, depression on wall surface. *** {Severity M}	SF		
c. Surface material damage evidenced by holes, cracks, loose panel material, and material deterioration. *** {Severity H}	SF	5	

Defect:			
* Corrosion: (caused by water damage, etc.) Observation:			
a. Surface deterioration (no pitting evident). *** {Severity L}	SF		
b. Deterioration evidenced by pitting, or blistering. *** {Severity M}	SF		
c. Deterioration evidenced by holes or loss of metal. *** {Severity H}	SF	5	5



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## 03.01 EXTERIOR WALL

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### COMPONENTS (Continued)

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#### ◆ 03.01.05 EXTERIOR WALL - GLAZED CURTAIN

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Glass/Plastic Panel Damage:</b> (caused by impact damage, exposure, etc) Observation:			
a. Damage evidenced by fading *** {Severity L}	SF		
b. Damage evidenced by cracked or loose panels. *** {Severity M}	SF		
c. Panel damage evidenced by holes, missing or broken panels. *** {Severity H}	SF		
d. Deteriorated or missing glazing *** {Severity H}	SF		

#### Defect:

* <b>Misalignment:</b> (caused by impact damage, building settlement, etc.) Observation:			
a. Noticeable misalignment evidenced by joint separation, compression or other component distress. *** {Severity M}	SF	5	
b. Noticeable misalignment evidenced by failure of anchor or attachment devices, presenting unsafe condition. *** {Severity H}	SF	5	5

## 03.01 EXTERIOR WALL

### COMPONENTS (Continued)

#### ◆ 03.01.06 EXTERIOR SURFACE - METAL

Metals commonly used for metal exterior sidings include aluminum, painted metal, galvanized iron and steel, and prefabricated sheet metal. Metal sidings offer low maintenance, good durability, and are light weight. They can come with factory finishes, and may provide textured finishes that resemble other building materials.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Surface Damage:</b> (caused by impact damage, previous maintenance patching, animal damage, water intrusion, etc.) Observation:			
a. Surface damage evidenced by mares, scratches, or scuffs on surface.	SF		
*** {Severity L}			
b. Surface damage evidenced by stains, graffiti on surface.	SF		
*** {Severity L}			
c. Surface material damage evidenced by dents, depression, bent, joint separation.	SF		
*** {Severity M}			
d. Surface material damage evidenced by holes, cracks, loose, missing or misaligned surface material, and material deterioration.	SF		
*** {Severity H}			
e. Trim damage evidenced by loose, missing or deteriorated material.	LF		
*** {Severity H}			

#### Defect:

* <b>Corrosion:</b> (caused by water damage, etc.) Observation:			
a. Surface deterioration (no pitting evident).	SF		
*** {Severity L}			
b. Deterioration evidenced by pitting, or blistering.	SF		
*** {Severity M}			
c. Deterioration evidenced by holes or loss of metal.	SF		
*** {Severity H}			

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## 03.01 EXTERIOR WALL

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### COMPONENTS (Continued)

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#### ◆ 03.01.07 EXTERIOR SURFACE - WOOD

The most common types of wood found in siding are pine, cedar, redwood, fir, cypress, hemlock, and spruce. Exterior walls may be covered with horizontal or vertical siding and nailed to the studs with or without an intervening layer of sheathing. Siding can be purchased with factory finishes or may be finished in the field.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Surface Damage:</b> (caused by impact damage, previous maintenance patching, insect/animal damage, water intrusion, etc.) Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on surface.	SF		
*** {Severity L}			
b. Surface damage evidenced by stains, graffiti on surface.	SF		
*** {Severity L}			
c. Surface material damage evidenced by dents, depression, splitting, joint separation.	SF		
*** {Severity M}			
d. Surface material damage evidenced by holes, cracks, loose, missing or misaligned surface material, and material deterioration.	SF		
*** {Severity H}			
e. Trim damage evidenced by loose, missing or deteriorated material.	LF		
*** {Severity H}			

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## 03.01 EXTERIOR WALL

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### COMPONENTS (Continued)

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#### ◆ 03.01.08 EXTERIOR SURFACE - VINYL

Vinyl siding is commonly a rigid polyvinyl chloride compound that is tough and durable. It is extruded into siding units, either horizontal or vertical, and accessories. Vinyl siding is usually installed with a backer board or insulation board behind each sheet. Panels are designed with interlocking joints that are moisture proof. Vinyl siding expands and contracts slightly with temperature changes, so nail holes are slotted to permit movement.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Surface Damage:</b> (caused by impact damage, previous maintenance patching, animal damage, water intrusion, etc.) Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on surface.	SF		
*** {Severity L}			
b. Surface damage evidenced by stains, graffiti on surface.	SF		
*** {Severity L}			
c. Surface material damage evidenced by dents, depression, splitting, joint separation.	SF		
*** {Severity M}			
d. Surface material damage evidenced by holes, cracks, loose, missing or misaligned surface material, and material deterioration.	SF		
*** {Severity H}			
e. Trim damage evidenced by loose, missing or deteriorated material.	LF		
*** {Severity H}			

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## 03.01 EXTERIOR WALL

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### COMPONENTS (Continued)

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#### ◆ 03.01.09 EXTERIOR SURFACE - HARDBOARD

Hardboard is comprised primarily of felted lignocellulosic fibers, manufactured to produce a siding material that is durable, easy to apply, and adaptable to various architectural effects. A manufacturing process known as "temping" substantially improves the properties of stiffness, strength, hardness, and resistance to water and abrasion. Most panels have a factory-applied primer coat and receive a finish coat in the field.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* Surface Damage:			
(caused by impact damage, previous maintenance patching, insect/animal damage, water intrusion, etc.)			
Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on surface.	SF		
*** {Severity L}			
b. Surface damage evidenced by stains, graffiti on surface.	SF		
*** {Severity L}			
c. Surface material damage evidenced by dents, depression, splitting, joint separation.	SF		
*** {Severity M}			
d. Surface material damage evidenced by holes, cracks, loose, missing or misaligned surface material, and material deterioration.	SF		
*** {Severity H}			
e. Trim damage evidenced by loose, missing or deteriorated material.	LF		
*** {Severity H}			

## 03.01 EXTERIOR WALL

### COMPONENTS (Continued)

#### ◆ 03.01.10 EXTERIOR SURFACE - TILE

Tile is a thin surfacing unit, made from clay or a mixture of clay and other ceramic materials, having either a glazed or unglazed face, and fired to a temperature sufficiently high to produce specific physical properties and characteristics. Their most common shapes are square, rectangle, hexagon, and circles of standard sizes which facilitate installation. The tiles are individually adhered to the substrate and grouted to fill the gaps between the tiles. Tiles provide protection from the elements while their main purpose is to give architectural appeal to the building.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Surface Damage:</b>			
(caused by impact damage, previous maintenance patching, water intrusion, spalling, cracking, deterioration, building settlement etc.)			
Observation:			
a. Surface damage evidenced by scratches or hairline cracks to the tile surface.	SF		
*** {Severity L}			
b. Surface damage evidenced by stains, efflorescence, graffiti on tile surface.	SF		
*** {Severity L}			
c. Surface material damage evidenced by spalling, cracks, or chips in tile surface.	SF		
*** {Severity M}			
d. Surface material damage evidenced by holes, cracks, spalling, or fault which allows air or moisture to penetrate the wall.	SF		
*** {Severity H}			
e. Trim damage evidenced by loose, missing or deteriorated material.	LF		
*** {Severity H}			

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**03.01 EXTERIOR WALL**

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**COMPONENTS (Continued)**

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**◆ 03.01.10 EXTERIOR SURFACE - TILE (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Grout Deterioration:</b>			
(caused by weathering, building settlement, etc.)			
Observation:			
a. Grout deterioration evidenced by hairline cracks or soft joints.	SF		
*** {Severity M}			
b. Grout deterioration evidenced by cracks, loose or missing.	SF		
*** {Severity H}			

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## 03.01 EXTERIOR WALL

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### COMPONENTS (Continued)

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#### ♦ 03.01.11 EXTERIOR SURFACE - PLASTER

Plastering is a generic term that refers to any of a number of cementitious substances that are applied to a surface in a paste form. Plaster may be applied directly to the exterior wall surface or to any of a group of plaster bases known as lath. It may be applied either by machine (spray) or by hand (trowel or float).

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* Surface Damage:			
(caused by impact damage, previous maintenance patching, animal damage, water intrusion, lath separation, etc.)			
Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on plaster surface.	SF		
*** {Severity L}			
b. Surface damage evidenced by stains, efflorescence, graffiti on plaster surface.	SF		
*** {Severity L}			
c. Surface material damage evidenced by depression or hairline cracks.	SF		
*** {Severity M}			
d. Surface material damage evidenced by holes, cracks, delamination, loose or missing surface material, and material deterioration.	SF		
*** {Severity H}			
e. Surface damage evidenced by lath separation or misalignment from structure.	SF		
*** {Severity H}			
f. Trim damage evidenced by loose, missing or deteriorated material.	LF		
*** {Severity H}			



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## 03.01 EXTERIOR WALL

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### COMPONENTS (Continued)

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#### ◆ 03.01.12 EXTERIOR SURFACE - SHINGLES

Shingles are relatively small individual siding units which overlap each other to provide weather protection. They typically are applied to a nailing base, such as sheathing or horizontal nailing strips, which supports the shingles between structural framing members.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Surface Damage:</b> (caused by impact damage, previous maintenance patching, animal damage, water intrusion, etc.) Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on shingle surface.	SF		
*** {Severity L}			
b. Surface damage evidenced by stains, graffiti on shingle surface.	SF		
*** {Severity L}			
c. Surface material damage evidenced by dents, depression, splitting, joint separation.	SF		
*** {Severity M}			
d. Surface material damage evidenced by holes, cracks, loose, missing or misaligned surface material, and material deterioration.	SF		
*** {Severity H}			
e. Trim damage evidenced by loose, missing or deteriorated material.	LF		
*** {Severity H}			

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## 03.01 EXTERIOR WALL

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### COMPONENTS (Continued)

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#### ◆ 03.01.13 EXTERIOR SURFACE - ASBESTOS TREATMENT

Because of possible health hazards associated with asbestos, asbestos materials have been replaced with newer safer products. However, asbestos shingles and siding are sometimes found on older structures. Asbestos shingles were usually supplied in rectangular units having straight or wavy butt edges. Depending on their size, the units range up to 3/16" in thickness. Siding units were manufactured with pre-punched nail holes correctly sized and located to receive exposed face nails.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Surface Damage:</b>			
(caused by impact damage, previous maintenance patching, animal damage, water intrusion, etc.)			
Observation:			
a. Surface damage evidenced by mares, scratches, or scuffs on asbestos surface.	SF		
*** {Severity L}			
b. Surface damage evidenced by stains, graffiti on asbestos surface.	SF		
*** {Severity L}			
c. Surface material damage evidenced by holes, cracks, loose, missing or misaligned surface material, and material deterioration.	SF		
*** {Severity H}			
d. Trim damage evidenced by loose, missing or deteriorated material.	LF		
*** {Severity H}			

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## 03.01 EXTERIOR WALL

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### COMPONENTS (Continued)

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#### ◆ 03.01.14 EXTERIOR WALL FINISH - PAINT/STAIN

Exterior Wall Finish includes painting, staining, and other similarly applied sealant or protective coatings which are used to cover the surface of the wall. Finishes are applied as a thin layer of coating to a substrate by brush, roller, sprayer, or other suitable method. The function of the finish is to seal, protect, or provide the desired appearance.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Finish Damage:</b> (caused by impact damage, previous maintenance patching, insect/animal damage, water intrusion, weathering, etc.) Observation:			
a. Finish damage evidenced by mars, scratches, scuffs, fading, and discoloration of finish.	SF		
*** {Severity L}			
b. Finish damage evidenced by stains or graffiti on finish.	SF		
*** {Severity L}			
c. Finish damage - peeling or missing, no exposure of substrate.	SF		
*** {Severity M}			
d. Finish damage evidenced by exposure of substrate.	SF		
*** {Severity H}			

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**03.01 EXTERIOR WALL**

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**COMPONENTS (Continued)**

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**◆ 03.01.15 EXTERIOR WALL JOINT SEALER/CAULKING**

Exterior control and expansion joints are filled with an elastic sealant which functions to protect the joint from moisture penetration.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Sealant Damage:</b>			
(caused by impact damage, exposure, water intrusion, etc)			
Observation:			
a. Sealant deterioration evidenced by hardening of sealant/caulking.	LF		
*** {Severity L}			
b. Sealant deterioration evidenced by shrinking, cracking, or missing.	LF		
*** {Severity H}			

## 03.01 EXTERIOR WALL

### COMPONENTS (Continued)

#### ◆ 03.01.16 ROOF DRAINAGE SYSTEM

The drainage system includes all gutters, leaders, downspouts, and accessories necessary to remove water from the roof surface.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
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**\* Surface Damage or Deterioration:**

Observation:

- |  |    |  |  |
|--|----|--|--|
| a. Deteriorated or missing protective coating, some loss of metal thickness. | LF |  |  |
| *** {Severity M}   |    |  |  |
| b. Severely damaged, missing, or leaking gutters, leaders, or downspouts.    | LF |  |  |
| *** {Severity H}   |    |  |  |

**Defect:**

**\* Improper Slope (Sagging) of Gutter:**

Observation:

- |   |    |  |  |
|---|----|--|--|
| a. Improper slope (sagging) of gutter, standing water.    | LF |  |  |
| *** {Severity L}  |    |  |  |
| b. Improper slope (sagging) of gutter, water overflowing. | LF |  |  |
| *** {Severity M}  |    |  |  |

**Defect:**

**\* Damaged or Missing Gutter Straps or Hangers:**

Observation:

- |   |    |  |  |
|---|----|--|--|
| a. Damaged or missing gutter straps or hangers. | EA |  |  |
| *** {Severity M}                                |    |  |  |

**Defect:**

**\* Damaged or Missing Downspout, Straps or Splash Blocks:**

Observation:

- |   |    |  |  |
|---|----|--|--|
| a. Damaged or missing downspout straps. | EA |  |  |
| *** {Severity L}                        |    |  |  |
| b. Damaged or missing downspout.        | LF |  |  |
| *** {Severity M}                        |    |  |  |

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**03.01 EXTERIOR WALL**

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**COMPONENTS (Continued)**

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**♦ 03.01.16 ROOF DRAINAGE SYSTEM (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
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**\* Damaged or Missing Downspout, Straps or Splash Blocks (Continued):**

Observation:

c. Downspout detached from storm drain system.	EA
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\*\*\* {Severity M}

d. Damaged or missing downspout splash blocks.	EA
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\*\*\* {Severity F}

Defect:

**\* Restricted or Clogged Gutters, Leaders, or Downspouts:**

Observation:

a. Debris in gutters, restricting drainage flow.	LF
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\*\*\* {Severity F}

b. Debris clogging leaders and/or downspouts.	EA
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\*\*\* {Severity F}

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## 03.01 EXTERIOR WALL

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### REFERENCES

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1. Condition Assessment Survey (CAS) Program, Deficiency Standards & Inspections Methods Manual, Vol. 4, Exterior Closures, Department of Energy, 1993
2. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
3. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
4. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
5. Modern Masonry, R. Putnam, Harcourt Brace Jovanovich, Publishers, 1988
6. Means Building Construction Cost Data, R. S. Means, 52nd Edition, 1994
7. Means Illustrated Construction Dictionary, R. S. Means, 1994
8. Architectural & Engineering Concrete Masonry Details for Building Construction, A. Elmiger, National Concrete Masonry Association, 1976
9. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
10. Modern Carpentry, W. H. Wagner, The Goodheart-Wilcox Company, Inc., 1983
11. NASA Facilities Maintenance Handbook, NHB 8831.2, 1991

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**03.01 EXTERIOR WALL**

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**LEVEL II KEY      GUIDE SHEET CONTROL NUMBER**

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1	GS-II 03.01.01-1
2	GS-II 03.01.02-2
3	GS-II 03.01.03-3
4	GS-II 03.01.04-4
5	GS-II 03.01.05-5

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**LEVEL III KEY      GUIDE SHEET CONTROL NUMBER**

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1	GS-III 03.01.01-1
2	GS-III 03.01.02-2
3	GS-III 03.01.03-3
4	GS-III 03.01.04-4
5	GS-III 03.01.05-5



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**LEVEL II INSPECTION METHOD GUIDE SHEET**

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**LEVEL II GUIDE SHEET - KEY NO. 1**

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**COMPONENT:** EXTERIOR WALL - CONCRETE  
**CONTROL NUMBER:** GS-II 03.01.01-1

**Application**

This guide applies to investigation of possible structural problems with exterior concrete walls evidenced by bulging, sagging, tilting, cracks, etc. The condition may be the result of settlement, impact damage, moisture, material failure or improper use of material.

**Special Safety Requirements**

No special safety requirements are needed for the performance of the Level II inspection beyond those required in the Master Safety Plan and System Safety Section.

**Inspection Action**

Results of LEVEL I inspection indicate a deficiency in the wall structure. Although LEVEL I inspection methodology is very useful for determining the general condition of the wall, the LEVEL II inspection provides a more thorough analyses of the cause of the deficiency or deterioration. Inspection actions to be used to further assess the extent of the component defect include the following actions:

1. Probe with screw driver to determine the extent of deterioration in terms of the depth, and gross dimension of the surface area exhibiting a deficiency.
2. Probe with screw driver to determine possible failure of structural member or bearing surface related to the wall.
3. Modify information in Data Collection Device to reflect the condition observed through Level II inspection.

**Special Tools and Equipment Requirements**

None

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**LEVEL II INSPECTION METHOD GUIDE SHEET**

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**LEVEL II GUIDE SHEET - KEY NO. 1 (Continued)**

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**COMPONENT:** EXTERIOR WALL - CONCRETE  
**CONTROL NUMBER:** GS-II 03.01.01-1

**Recommended Inspection Frequency**

There is no standard frequency prescribed for this component. The Level II inspection is activated by deficiencies observed during the Level I inspections.

**References**

1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
3. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
4. Means Illustrated Construction Dictionary, R. S. Means, 1994
5. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
6. Modern Carpentry, W. H. Wagner, The Goodheart-Wilcox Company, Inc., 1983

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**LEVEL II INSPECTION METHOD GUIDE SHEET**

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**LEVEL II GUIDE SHEET - KEY NO. 2**

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**COMPONENT:** EXTERIOR WALL - MASONRY/STONE  
**CONTROL NUMBER:** GS-II 03.01.02-1

**Application**

This guide applies to investigation of possible structural problems with exterior masonry/stone walls evidenced by bulging, sagging, tilting, cracks, etc. The condition may be the result of settlement, impact damage, moisture, material failure or improper use of material.

**Special Safety Requirements**

No special safety requirements are needed for the performance of the Level II inspection beyond those required in the Master Safety Plan and System Safety Section.

**Inspection Action**

Results of LEVEL I inspection indicate a deficiency in the wall structure. Although LEVEL I inspection methodology is very useful for determining the general condition of the wall, the LEVEL II inspection provides a more thorough analyses of the cause of the deficiency or deterioration. Inspection actions to be used to further assess the extent of the component defect include the following actions:

1. Probe with screw driver to determine the extent of deterioration in terms of the depth, and gross dimension of the surface area exhibiting a deficiency.
2. Probe with screw driver to determine possible failure of structural member or bearing surface related to the wall.
3. Modify information in Data Collection Device to reflect the condition observed through Level II inspection.

**Special Tools and Equipment Requirements**

None

**Recommended Inspection Frequency**

There is no standard frequency prescribed for this component. The Level II inspection is activated by deficiencies observed during the Level I inspections.

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**LEVEL II INSPECTION METHOD GUIDE SHEET**

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**LEVEL II GUIDE SHEET - KEY NO. 2 (Continued)**

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**COMPONENT:** EXTERIOR WALL - MASONRY/STONE  
**CONTROL NUMBER:** GS-II 03.01.02-1

**References**

1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
3. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
4. Means Illustrated Construction Dictionary, R. S. Means, 1994
5. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
6. Modern Carpentry, W. H. Wagner, The Goodheart-Wilcox Company, Inc., 1983

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**LEVEL II INSPECTION METHOD GUIDE SHEET**

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**LEVEL II GUIDE SHEET - KEY NO. 3**

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**COMPONENT:** EXTERIOR WALL - GLASS BLOCK  
**CONTROL NUMBER:** GS-II 03.01.03-3

**Application**

This guide applies to investigation of possible structural problems with exterior glass walls evidenced by bulging, sagging, tilting, cracks, etc. The condition may be the result of settlement, impact damage, moisture, material failure or improper use of material.

**Special Safety Requirements**

No special safety requirements are needed for the performance of the Level II inspection beyond those required in the Master Safety Plan and System Safety Section.

**Inspection Action**

Results of LEVEL I inspection indicate a deficiency in the wall structure. Although LEVEL I inspection methodology is very useful for determining the general condition of the wall, the LEVEL II inspection provides a more thorough analyses of the cause of the deficiency or deterioration. Inspection actions to be used to further assess the extent of the component defect include the following actions:

1. Probe with screw driver to determine the extent of deterioration in terms of the depth, and gross dimension of the surface area exhibiting a deficiency.
2. Probe with screw driver to determine possible failure of structural member or bearing surface related to the wall.
3. Modify information in Data Collection Device to reflect the condition observed through Level II inspection.

**Special Tools and Equipment Requirements**

None

**Recommended Inspection Frequency**

There is no standard frequency prescribed for this component. The Level II inspection is activated by deficiencies observed during the Level I inspections.

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**LEVEL II INSPECTION METHOD GUIDE SHEET**

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**LEVEL II GUIDE SHEET - KEY NO. 3 (Continued)**

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**COMPONENT:** EXTERIOR WALL - GLASS BLOCK  
**CONTROL NUMBER:** GS-II 03.01.03-3

**References**

1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
3. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
4. Means Illustrated Construction Dictionary, R. S. Means, 1994
5. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
6. Modern Carpentry, W. H. Wagner, The Goodheart-Wilcox Company, Inc., 1983

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**LEVEL II INSPECTION METHOD GUIDE SHEET**

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**LEVEL II GUIDE SHEET - KEY NO. 4**

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**COMPONENT:** EXTERIOR WALL - STUD FRAMING**CONTROL NUMBER:** GS-II 03.01.04-4**Application**

This guide applies to investigation of possible structural problems with structurally framed exterior walls evidenced by bulging, sagging, tilting, cracks, etc. The condition may be the result of settlement, impact damage, moisture, material failure or improper use of material.

**Special Safety Requirements**

No special safety requirements are needed for the performance of the Level II inspection beyond those required in the Master Safety Plan and System Safety Section.

**Inspection Action**

Results of LEVEL I inspection indicate a deficiency in the wall structure. Although LEVEL I inspection methodology is very useful for determining the general condition of the wall, the LEVEL II inspection provides a more thorough analyses of the cause of the deficiency or deterioration. Inspection actions to be used to further assess the extent of the component defect include the following actions:

1. Probe with screw driver to determine the extent of deterioration in terms of the depth, and gross dimension of the surface area exhibiting a deficiency.
2. Probe with screw driver to determine possible failure of structural member or bearing surface related to the wall.
3. Modify information in Data Collection Device to reflect the condition observed through Level II inspection.

**Special Tools and Equipment Requirements**

None

**Recommended Inspection Frequency**

There is no standard frequency prescribed for this component. The Level II inspection is activated by deficiencies observed during the Level I inspections.

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**LEVEL II INSPECTION METHOD GUIDE SHEET**

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**LEVEL II GUIDE SHEET - KEY NO. 4 (Continued)**

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**COMPONENT:** EXTERIOR WALL - STUD FRAMING  
**CONTROL NUMBER:** GS-II 03.01.04-4

**References**

1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
3. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
4. Means Illustrated Construction Dictionary, R. S. Means, 1994
5. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
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**LEVEL II INSPECTION METHOD GUIDE SHEET**

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**LEVEL II GUIDE SHEET - KEY NO. 5**

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**COMPONENT:** EXTERIOR WALL - GLAZED CURTAIN  
**CONTROL NUMBER:** GS-II 03.01.05-5

**Application**

This guide applies to investigation of possible structural problems with exterior glazed curtain walls evidenced by bulging, sagging, tilting, cracks, etc. The condition may be the result of settlement, impact damage, moisture, material failure or improper use of material.

**Special Safety Requirements**

No special safety requirements are needed for the performance of the Level II inspection beyond those required in the Master Safety Plan and System Safety Section.

**Inspection Action**

Results of LEVEL I inspection indicate a deficiency in the wall structure. Although LEVEL I inspection methodology is very useful for determining the general condition of the wall, the LEVEL II inspection provides a more thorough analyses of the cause of the deficiency or deterioration. Inspection actions to be used to further assess the extent of the component defect include the following actions:

1. Probe with screw driver to determine the extent of deterioration in terms of the depth, and gross dimension of the surface area exhibiting a deficiency.
2. Probe with screw driver to determine possible failure of structural member or bearing surface related to the wall.
3. Modify information in Data Collection Device to reflect the condition observed through Level II inspection.

**Special Tools and Equipment Requirements**

None

**Recommended Inspection Frequency**

There is no standard frequency prescribed for this component. The Level II inspection is activated by deficiencies observed during the Level I inspections.

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**LEVEL II INSPECTION METHOD GUIDE SHEET**

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**LEVEL II GUIDE SHEET - KEY NO. 5 (Continued)**

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**COMPONENT:** EXTERIOR WALL - GLAZED CURTAIN

**CONTROL NUMBER:** GS-II 03.01.05-5

**References**

1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
3. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
4. Means Illustrated Construction Dictionary, R. S. Means, 1994
5. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
6. Modern Carpentry, W. H. Wagner, The Goodheart-Wilcox Company, Inc., 1983

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**LEVEL III INSPECTION METHOD GUIDE SHEET**

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**LEVEL III GUIDE SHEET - KEY NO. 1**

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**COMPONENT:** EXTERIOR WALL - CONCRETE  
**CONTROL NUMBER:** GS-III 03.01.01-1

**Application**

This guide applies to investigation of possible structural problems with exterior concrete walls evidenced by bulging, sagging, tilting, cracks, etc. The condition may be the result of settlement, impact damage, moisture, material failure or improper use of material. This inspection should be utilized in cases where the Level I/Level II inspection does not yield a conclusive answer.

**Special Safety Requirements**

No special safety requirements are needed for the performance of the Level III inspection beyond those required in the Master Safety Plan and System Safety Section.

**Inspection Action**

Level III inspection requires the expertise of an individual that is trained and qualified in the inspection and analysis of the structural integrity of buildings to further assess the extent of the component defect.

1. Review facility data files (As-Builts, Architectural and Structural plans) to determine the design intent and apparent requirement of the wall construction related to the component.
2. Analyze inspection data from Level I and II inspection, in conjunction with the As-Built drawings, Architectural and Structural plans, to determine whether further inspection should be performed, and if so, by in-house technical capabilities or by licensed technician/engineer.
3. Order inspection to be completed to determine extent and cost associated with correcting the deficiency.

**Special Tools and Equipment Requirements**

The following is a list of special tools and equipment beyond those listed in the Standard Tool Section.

1. Saw for cutting access holes
2. Tools for removing disturbed material
3. Tools and material for patching inspection access openings

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**LEVEL III INSPECTION METHOD GUIDE SHEET**

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**LEVEL III GUIDE SHEET - KEY NO. 1 (Continued)**

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**COMPONENT:** EXTERIOR WALL - CONCRETE  
**CONTROL NUMBER:** GS-III 03.01.01-1

**Recommended Inspection Frequency**

There is no standard frequency prescribed for this component. The Level III inspection is activated by deficiencies observed during the Level I and/or Level II inspections.

**References**

1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
3. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
4. Means Illustrated Construction Dictionary, R. S. Means, 1994
5. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
6. Modern Carpentry, W. H. Wagner, The Goodheart-Wilcox Company, Inc., 1983

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**LEVEL III INSPECTION METHOD GUIDE SHEET**

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**LEVEL III GUIDE SHEET - KEY NO. 2**

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**COMPONENT:** EXTERIOR WALL - MASONRY/STONE**CONTROL NUMBER:** GS-III 03.01.02-2**Application**

This guide applies to investigation of possible structural problems with exterior masonry or stone walls evidenced by bulging, sagging, tilting, cracks, etc. The condition may be the result of settlement, impact damage, moisture, material failure or improper use of material.

**Special Safety Requirements**

No special safety requirements are needed for the performance of the Level III inspection beyond those required in the Master Safety Plan and System Safety Section.

**Inspection Action**

Level III inspection requires the expertise of an individual that is trained and qualified in the inspection and analysis of the structural integrity of buildings to further assess the extent of the component defect.

1. Review facility data files (As-Builts, Architectural and Structural plans) to determine the design intent and apparent requirement of the wall construction related to the component.
2. Analyze inspection data from Level I and II inspection, in conjunction with the As-Built drawings, Architectural and Structural plans, to determine whether further inspection should be performed, and if so, by in-house technical capabilities or by licensed technician/engineer.
3. Order inspection to be completed to determine extent and cost associated with correcting the deficiency.

**Special Tools and Equipment Requirements**

The following is a list of special tools and equipment beyond those listed in the Standard Tool Section.

1. Saw for cutting access holes
2. Tools for removing disturbed material
3. Tools and material for patching inspection access openings

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**LEVEL III INSPECTION METHOD GUIDE SHEET**

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**LEVEL III GUIDE SHEET - KEY NO. 2 (Continued)**

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**COMPONENT:** EXTERIOR WALL - MASONRY/STONE  
**CONTROL NUMBER:** GS-III 03.01.02-2

**Recommended Inspection Frequency**

There is no standard frequency prescribed for this component. The Level III inspection is activated by deficiencies observed during the Level I and/or Level II inspections.

**References**

1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
3. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
4. Means Illustrated Construction Dictionary, R. S. Means, 1994
5. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
6. Modern Carpentry, W. H. Wagner, The Goodheart-Wilcox Company, Inc., 1983

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**LEVEL III INSPECTION METHOD GUIDE SHEET**

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**LEVEL III GUIDE SHEET - KEY NO. 3**

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**COMPONENT:** EXTERIOR WALL - GLASS BLOCK  
**CONTROL NUMBER:** GS-III 03.01.03-3

**Application**

This guide applies to investigation of possible structural problems with glass block exterior walls evidenced by bulging, sagging, tilting, cracks, etc. The condition may be the result of settlement, impact damage, moisture, material failure or improper use of material.

**Special Safety Requirements**

No special safety requirements are needed for the performance of the Level III inspection beyond those required in the Master Safety Plan and System Safety Section.

**Inspection Action**

Level III inspection requires the expertise of an individual that is trained and qualified in the inspection and analysis of the structural integrity of buildings to further assess the extent of the component defect.

1. Review facility data files (As-Builts, Architectural and Structural plans) to determine the design intent and apparent requirement of the wall construction related to the component.
2. Analyze inspection data from Level I and II inspection, in conjunction with the As-Built drawings, Architectural and Structural plans, to determine whether further inspection should be performed, and if so, by in-house technical capabilities or by licensed technician/engineer.
3. Order inspection to be completed to determine extent and cost associated with correcting the deficiency.

**Special Tools and Equipment Requirements**

The following is a list of special tools and equipment beyond those listed in the Standard Tool Section.

1. Saw for cutting access holes
2. Tools for removing disturbed material
3. Tools and material for patching inspection access openings

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**LEVEL III INSPECTION METHOD GUIDE SHEET**

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**LEVEL III GUIDE SHEET - KEY NO. 3 (Continued)**

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**COMPONENT:** EXTERIOR WALL - GLASS BLOCK  
**CONTROL NUMBER:** GS-III 03.01.03-3

**Recommended Inspection Frequency**

There is no standard frequency prescribed for this component. The Level III inspection is activated by deficiencies observed during the Level I and/or Level II inspections.

**References**

1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
3. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
4. Means Illustrated Construction Dictionary, R. S. Means, 1994
5. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
6. Modern Carpentry, W. H. Wagner, The Goodheart-Wilcox Company, Inc., 1983



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**LEVEL III INSPECTION METHOD GUIDE SHEET**

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**LEVEL III GUIDE SHEET - KEY NO. 4**

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**COMPONENT:** EXTERIOR WALL - STUD FRAMING**CONTROL NUMBER:** GS-III 03.01.04-4**Application**

This guide applies to investigation of possible structural problems with stud framed exterior walls evidenced by bulging, sagging, tilting, cracks, etc. The condition may be the result of settlement, impact damage, moisture, material failure or improper use of material. In several cases, this may require destructive testing in order to examine the structural portion of the wall.

**Special Safety Requirements**

No special safety requirements are needed for the performance of the Level III inspection beyond those required in the Master Safety Plan and System Safety Section.

**Inspection Action**

Level III inspection requires the expertise of an individual that is trained and qualified in the inspection and analysis of the structural integrity of buildings to further assess the extent of the component defect.

1. Review facility data files (As-Builts, Architectural and Structural plans) to determine the design intent and apparent requirement of the wall construction related to the component.
2. Analyze inspection data from Level I and II inspection, in conjunction with the As-Built drawings, Architectural and Structural plans, to determine whether further inspection should be performed, and if so, by in-house technical capabilities or by licensed technician/engineer.
3. Order inspection to be completed to determine extent and cost associated with correcting the deficiency.

**Special Tools and Equipment Requirements**

The following is a list of special tools and equipment beyond those listed in the Standard Tool Section.

1. Saw for cutting access holes
2. Tools for removing disturbed material
3. Tools and material for patching inspection access openings

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**LEVEL III INSPECTION METHOD GUIDE SHEET**

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**LEVEL III GUIDE SHEET - KEY NO. 4 (Continued)**

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**COMPONENT:** EXTERIOR WALL - STUD FRAMING  
**CONTROL NUMBER:** GS-III 03.01.04-4

**Recommended Inspection Frequency**

There is no standard frequency prescribed for this component. The Level III inspection is activated by deficiencies observed during the Level I and/or Level II inspections.

**References**

1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
3. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
4. Means Illustrated Construction Dictionary, R. S. Means, 1994
5. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
6. Modern Carpentry, W. H. Wagner, The Goodheart-Wilcox Company, Inc., 1983

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**LEVEL III INSPECTION METHOD GUIDE SHEET**

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**LEVEL III GUIDE SHEET - KEY NO. 5**

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**COMPONENT:** EXTERIOR WALL - GLAZED CURTAIN  
**CONTROL NUMBER:** GS-III 03.01.05-5

**Application**

This guide applies to investigation of possible structural problems with exterior glazed curtain walls evidenced by bulging, sagging, tilting, cracks, etc. The condition may be the result of settlement, impact damage, moisture, material failure or improper use of material.

**Special Safety Requirements**

No special safety requirements are needed for the performance of the Level III inspection beyond those required in the Master Safety Plan and System Safety Section.

**Inspection Action**

Level III inspection requires the expertise of an individual that is trained and qualified in the inspection and analysis of the structural integrity of buildings to further assess the extent of the component defect.

1. Review facility data files (As-Builts, Architectural and Structural plans) to determine the design intent and apparent requirement of the wall construction related to the component.
2. Analyze inspection data from Level I and II inspection, in conjunction with the As-Built drawings, Architectural and Structural plans, to determine whether further inspection should be performed, and if so, by in-house technical capabilities or by licensed technician/engineer.
3. Order inspection to be completed to determine extent and cost associated with correcting the deficiency.

**Special Tools and Equipment Requirements**

The following is a list of special tools and equipment beyond those listed in the Standard Tool Section.

1. Saw for cutting access holes
2. Tools for removing disturbed material
3. Tools and material for patching inspection access openings

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**LEVEL III INSPECTION METHOD GUIDE SHEET**

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**LEVEL III GUIDE SHEET - KEY NO. 5 (Continued)**

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**COMPONENT:** EXTERIOR WALL - GLAZED CURTAIN  
**CONTROL NUMBER:** GS-III 03.01.05-5

**Recommended Inspection Frequency**

There is no standard frequency prescribed for this component. The Level III inspection is activated by deficiencies observed during the Level I and/or Level II inspections.

**References**

1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
3. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
4. Means Illustrated Construction Dictionary, R. S. Means, 1994
5. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
6. Modern Carpentry, W. H. Wagner, The Goodheart-Wilcox Company, Inc., 1983

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## 03.02 EXTERIOR DOOR

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### DESCRIPTION

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Exterior doors are a subsystem of the Building Exterior system. Doors are the operating part of the entrance that allow access to and egress from the building. Their classification and number are determined by the use of the building and the building codes that are in force for that location. Doors serve as part of the building's envelope by preventing the intrusion of unwanted weather, noise, and unauthorized personnel. Doors are designed to permit the passage of people, including the handicapped or equipment and supplies or both. The primary materials used in the construction of doors are metals, wood, glass, and combinations of these materials.

### SPECIAL TOOL AND EQUIPMENT REQUIREMENTS

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No special tools are needed for the inspection of the doors, beyond the requirements listed in the Building Exterior Standard Tools Section.

### SPECIAL SAFETY REQUIREMENTS

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No special safety requirements are needed for the inspection of the doors, beyond the requirements listed in the Master Safety Plan and System Safety Section.

### COMPONENT LIST

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- ◆ 03.02.01 EXTERIOR DOOR - METAL
- ◆ 03.02.02 EXTERIOR DOOR - WOOD
- ◆ 03.02.03 EXTERIOR DOOR - GLASS
- ◆ 03.02.04 EXTERIOR DOOR - OVERHEAD
- ◆ 03.02.05 EXTERIOR DOOR - OTHER
- ◆ 03.02.06 EXTERIOR DOOR FRAME - METAL
- ◆ 03.02.07 EXTERIOR DOOR FRAME - WOOD
- ◆ 03.02.08 EXTERIOR DOOR HARDWARE
- ◆ 03.02.09 EXTERIOR DOOR AUTOMATIC OPERATORS
- ◆ 03.02.10 EXTERIOR DOOR/FRAME - FINISH
- ◆ 03.02.11 EXTERIOR DOOR JOINT SEALANT/CAULKING

### RELATED SUBSYSTEMS

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Due to the related nature of the elements requiring inspection, the following DS/IM's should be reviewed for concurrent inspection activities.

- |       |  |
|-------|--|
| 03.01 | BUILDING EXTERIOR WALL                 |
| 03.03 | BUILDING EXTERIOR WINDOW               |
| 01    | BUILDING SUBSTRUCTURE (all subsystems) |

## 03.02 EXTERIOR DOOR

### STANDARD INSPECTION PROCEDURE

The standard inspection procedure for the Exterior Door subsystem is a visual inspection of each exterior door, augmented by a Level II Inspection when required. Very few Level II or III inspection keys are indicated for the Building Exterior Door subsystem. The inspection should be carried out in order of presentation of the various components. Associated defects and observations are listed which will be presented in the inspector's Data Collection Device (DCD).

### COMPONENTS

#### ◆ 03.02.01 EXTERIOR DOOR - METAL

Hollow metal doors are either panel or flush types. They are constructed primarily of cold-rolled sheet steel especially processed to give a smooth flat surface. Metal doors may be supplied bonded and primed, galvanized and primed, factory-finished in selected colors, or in stainless steel. Doors with lead-lined cores are available for shielded applications.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* Surface Damage:			
(caused by impact damage, previous maintenance patching, animal damage, water intrusion, etc.)			
Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on door.	SF		
*** {Severity L}			
b. Surface material damage evidenced by dents, depression on door.	SF		
*** {Severity M}			
c. Surface material damage evidenced by holes, loose surface material, joint separation and material deterioration.	SF		
*** {Severity H}			

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## 03.02 EXTERIOR DOOR

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### COMPONENTS (Continued)

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#### ◆ 03.02.01 EXTERIOR DOOR - METAL (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* Corrosion:			
(caused by water damage, etc.)			
Observation:			
a. Surface deterioration (no pitting evident).	SF		
*** {Severity L}			
b. Deterioration evidenced by pitting, or blistering.	SF		
*** {Severity M}			
c. Deterioration evidenced by holes or loss of metal.	SF		
*** {Severity H}			

#### Defect:

* Glass Damage:			
(caused by impact damage, exposure, etc)			
Observation:			
a. Damage evidenced by fading.	SF		
*** {Severity L}			
b. Damage evidenced by cracks.	SF		
*** {Severity M}			
c. Glass damage evidenced by missing or broken with holes.	SF		
*** {Severity H}			
d. Deteriorated or missing glazing	SF		
*** {Severity H}			

#### Defect:

* Screen Damage:			
(caused by impact damage, use, animal damage, etc.)			
Observation:			
a. Screen damage evidenced by bent, snags or scratches.	SF		
*** {Severity L}			
b. Screen damage evidenced by missing, holes, torn, or loose.	SF		
*** {Severity H}			

## 03.02 EXTERIOR DOOR

### COMPONENTS (Continued)

#### ◆ 03.02.02 EXTERIOR DOOR - WOOD

Wood doors are manufactured in either flush or panel design, solid or hollow-core. Flush doors have veneers that are exterior-glued and matched in their grain pattern. Panel doors consist of solid wood stiles and rails that make-up the doors structure. The panels are wood veneered plywood. Solid-core construction consists of wood blocking, or particle board core. Solid-core doors are advantageous in fire-rating, radiation protection, strength, and durability. Hollow-core doors can be filled with insulation to improve thermal and acoustical properties.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Surface Damage:</b> (caused by impact damage, previous maintenance patching, insect/ animal damage, water intrusion, etc.) Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on door.	SF		
*** {Severity L}			
b. Surface material damage evidenced by dents, depression, splitting of door.	SF		
*** {Severity M}			
c. Surface material damage evidenced by holes, cracks, delamination, loose surface material, and material deterioration.	SF		
*** {Severity H}			

#### Defect:

* <b>Glass Damage:</b> (caused by impact damage, exposure, etc) Observation:			
a. Damage evidenced by fading	SF		
*** {Severity L}			
b. Damage evidenced by cracks.	SF		
*** {Severity M}			
c. Glass damage evidenced by missing or broken with holes.	SF		
*** {Severity H}			
d. Deteriorated or missing glazing	SF		
*** {Severity H}			



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**03.02 EXTERIOR DOOR**

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**COMPONENTS (Continued)**

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**◆ 03.02.02 EXTERIOR DOOR - WOOD (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Screen Damage:</b>			
(caused by impact damage, use, animal damage, etc.)			
Observation:			
a. Screen damage evidenced by bent, snags or scratches.	SF		
*** {Severity L}			
b. Screen damage evidenced by missing, holes, torn, or loose.	SF		
*** {Severity H}			

## 03.02 EXTERIOR DOOR

### COMPONENTS (Continued)

#### ◆ 03.02.03 EXTERIOR DOOR - GLASS

Glass doors are frequently used as the main entrances or storefronts on public buildings. Most buildings are designed to incorporate vestibules which have two sets of doors that stop the loss of heat from the main building. Glass doors are also used for patio doors (sliders) in residential construction. The glass assemblies include the following components: (1) glass, (2) transoms, (3) sidelights, and (4) additional panels. The glass can be single pane, double pane, tempered, or tinted.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Surface Damage:</b> (caused by impact damage, previous maintenance patching, water intrusion, etc.) Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on door.	SF		
*** {Severity L}			
b. Surface material damage evidenced by dents, depression, splitting of door.	SF		
*** {Severity M}			
c. Surface material damage evidenced by holes, cracks, delamination, loose surface material, and material deterioration.	SF		
*** {Severity H}			

#### Defect:

* <b>Corrosion:</b> (caused by water damage, etc.) Observation:			
a. Surface deterioration (no pitting evident).	SF		
*** {Severity L}			
b. Deterioration evidenced by pitting, or blistering.	SF		
*** {Severity M}			
c. Deterioration evidenced by holes or loss of metal.	SF		
*** {Severity H}			

## 03.02 EXTERIOR DOOR

### COMPONENTS (Continued)

#### ◆ 03.02.03 EXTERIOR DOOR - GLASS (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
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**\* Glass Damage:**

(caused by impact damage, exposure, etc)

Observation:

- |   |    |  |  |
|---|----|--|--|
| a. Damage evidenced by fading<br>*** {Severity L}                                 | SF |  |  |
| b. Damage evidenced by cracks.<br>*** {Severity M}                                | SF |  |  |
| c. Glass damage evidenced by<br>missing or broken with holes.<br>*** {Severity H} | SF |  |  |
| d. Deteriorated or missing glazing<br>*** {Severity H}                            | SF |  |  |

**Defect:**

**\* Screen Damage:**

(caused by impact damage, use,  
animal damage, etc.)

Observation:

- |  |    |  |  |
|--|----|--|--|
| a. Screen damage evidenced by bent,<br>snags or scratches.<br>*** {Severity L}       | SF |  |  |
| b. Screen damage evidenced by<br>missing, holes, torn, or loose.<br>*** {Severity H} | SF |  |  |

## 03.02 EXTERIOR DOOR

### COMPONENTS (Continued)

#### ♦ 03.02.04 EXTERIOR DOOR - OVERHEAD

Overhead doors are constructed of a single leaf or of multiple leaves, swung up or rolled open from the ground level and assume a horizontal position above the entrance way when open. Overhead coiling doors consist of a curtain of interlocking corrugated-steel slats which rolls up on a roller or drum in much the same way as a window shade. Doors can be operated by chain hoist, crank hoist, or electric motors.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Surface Damage:</b> (caused by impact damage, previous maintenance patching, insect/animal damage, water intrusion, etc.) Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on door.	SF		
*** {Severity L}			
b. Surface material damage evidenced by dents, depression, splitting of door.	SF		
*** {Severity M}			
c. Surface material damage evidenced by holes, cracks, delamination, loose surface material, and material deterioration.	SF		
*** {Severity H}			

#### Defect:

* <b>Corrosion:</b> (caused by water damage, etc.) Observation:			
a. Surface deterioration (no pitting evident).	SF		
*** {Severity L}			
b. Deterioration evidenced by pitting, or blistering.	SF		
*** {Severity M}			
c. Deterioration evidenced by holes or loss of metal.	SF		
*** {Severity H}			

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**03.02 EXTERIOR DOOR**

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**COMPONENTS (Continued)**

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**◆ 03.02.04 EXTERIOR DOOR - OVERHEAD (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Glass Damage:</b>			
(caused by impact damage, exposure, etc)			
Observation:			
a. Damage evidenced by fading	SF		
*** {Severity L}			
b. Damage evidenced by cracks.	SF		
*** {Severity M}			
c. Glass damage evidenced by	SF		
missing or broken with holes.			
*** {Severity H}			
d. Deteriorated or missing glazing	SF		
*** {Severity H}			

## 03.02 EXTERIOR DOOR

### COMPONENTS (Continued)

#### ◆ 03.02.05 EXTERIOR DOOR - OTHER

The doors in this section are designed for specific and unique applications. Some of the applications include fire rating, thermal properties, over-sized openings, special service, and controlled access.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Surface Damage:</b> (caused by impact damage, previous maintenance patching, insect/ animal damage, water intrusion, etc.) Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on door.	SF		
*** {Severity L}			
b. Surface material damage evidenced by dents, depression, splitting of door.	SF		
*** {Severity M}			
c. Surface material damage evidenced by holes, cracks, delamination, loose surface material, and material deterioration.	SF		
*** {Severity H}			

#### Defect:

* <b>Corrosion:</b> (caused by water damage, etc.) Observation:			
a. Surface deterioration (no pitting evident).	SF		
*** {Severity L}			
b. Deterioration evidenced by pitting, or blistering.	SF		
*** {Severity M}			
c. Deterioration evidenced by holes or loss of metal.	SF		
*** {Severity H}			

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**03.02 EXTERIOR DOOR**

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**COMPONENTS (Continued)**

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**♦ 03.02.05 EXTERIOR DOOR - OTHER (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Glass Damage:</b>			
(caused by impact damage, exposure, etc)			
Observation:			
a. Damage evidenced by fading.	SF		
*** {Severity L}			
b. Damage evidenced by cracks.	SF		
*** {Severity M}			
c. Glass damage evidenced by missing or broken with holes.	SF		
*** {Severity H}			
d. Deteriorated or missing glazing.	SF		
*** {Severity H}			

## 03.02 EXTERIOR DOOR

### COMPONENTS (Continued)

#### ◆ 03.02.06 EXTERIOR DOOR FRAME - METAL

Frames support the doors, anchor the hardware, and present a finished appearance by forming a transition between the door and the wall. Metal frames may be supplied in various gauges of galvanized or plain steel in knockdown standard frames or welded customized frames that can be fabricated to satisfy most design conditions. Frames may be wrap around (enclosing the wall) or butt up against the opening. Frames are normally reinforced at stress points and are prepared for hardware. Frames are attached to the walls with anchors which are supplied to suit the wall construction requirements.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* Surface Damage:			
(caused by impact damage, previous maintenance patching, animal damage, water intrusion, etc.)			
Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on frame.	LF		
*** {Severity L}			
b. Surface material damage evidenced by dents, depression, splitting of frame.	LF		
*** {Severity M}			
c. Surface material damage evidenced by holes, cracks, delamination, loose surface material, material deterioration, joint separation.	LF		
*** {Severity H}			

#### Defect:

* Corrosion:			
(caused by water damage, etc.)			
Observation:			
a. Surface deterioration (no pitting evident).	LF		
*** {Severity L}			
b. Deterioration evidenced by pitting, or blistering.	LF		
*** {Severity M}			
c. Deterioration evidenced by holes or loss of metal.	LF		
*** {Severity H}			



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**03.02 EXTERIOR DOOR**

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**COMPONENTS (Continued)**

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**◆ 03.02.06 EXTERIOR DOOR FRAME - METAL (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Misalignment:</b>			
(caused by impact damage, use, building settlement, etc.)			
Observation:			
a. Noticeable misalignment, not allowing the door to open or close.	LF		
*** {Severity H}			

## 03.02 EXTERIOR DOOR

### COMPONENTS (Continued)

#### ◆ 03.02.07 EXTERIOR DOOR FRAME - WOOD

Frames support the doors, anchor the hardware, and present a finished appearance by forming a transition between the door and the wall. Wood frames are made of various species that complement the door and the exterior finish. Frames are normally reinforced at stress points and are prepared for hardware. Frames are attached to the walls with anchors which are supplied to suit the wall construction requirements.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
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**\* Surface Damage:**

(caused by impact damage, previous maintenance patching, insect damage, animal damage, water intrusion, etc.)

Observation:

a. Surface damage evidenced by marks, scratches, or scuffs on frame.	LF		
---	----	--	--

\*\*\* {Severity L}

b. Surface material damage evidenced by dents, depression, splitting of frame.	LF		
---	----	--	--

\*\*\* {Severity M}

c. Surface material damage evidenced by holes, cracks, delamination, loose surface material, material deterioration, joint separation	LF		
--	----	--	--

\*\*\* {Severity H}

**Defect:**

**\* Misalignment:**

(caused by impact damage, use, building settlement, etc.)

Observation:

a. Noticeable misalignment, not allowing the door to open or close.	LF		
---	----	--	--

\*\*\* {Severity H}

## 03.02 EXTERIOR DOOR

### COMPONENTS (Continued)

#### ◆ 03.02.08 EXTERIOR DOOR HARDWARE

Hardware is mounted to doors and frames to facilitate hanging, operating, closing, locking, sealing, or protecting.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
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**\* Defective Operation :**

(caused by impact damage, wear, and use)

Observation:

a. Door hardware operates poorly (sticks, hard to turn, etc)	EA
--	----

\*\*\* {Severity M}

b. Fails to perform intended operation (door doesn't fasten, lock, or open).	EA
--	----

\*\*\* {Severity H}

**Defect:**

**\* Physical Damage:**

(caused by impact damage, wear, and use)

Observation:

a. Loose, worn, or misaligned. Requires tightening or adjusting.	EA
---	----

\*\*\* {Severity L}

b. Broken or missing.	EA
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\*\*\* {Severity H}

## 03.02 EXTERIOR DOOR

### COMPONENTS (Continued)

#### ◆ 03.02.09 EXTERIOR DOOR AUTOMATIC OPERATORS

Automatic operators are mounted to doors and frames to facilitate operating, closing, locking, sealing, or protecting and typically utilize a control mechanism (sensor or switch) coupled with an operating or locking mechanism.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Physical Damage:</b>			
(caused by impact damage, wear, and use)			
Observation:			
a. Loose, worn, or misaligned. Requires tightening or adjusting.	EA		
*** {Severity L}			
b. Broken or missing.	EA		
*** {Severity H}			
<b>Defect:</b>			
* <b>Sensor/Switch Broken or Inoperative:</b>			
Observation:			
a. Sensor or switch is difficult to activate.	EA	1	
*** {Severity M}			
b. Sensor or switch does not operate door opener or lock.	EA		1
*** {Severity H}			
<b>Defect:</b>			
* <b>Opener/Actuator Working Improperly:</b>			
Observation:			
a. Opener/actuator works but grinds, catches or otherwise displays signs of poor operation (operator/actuator travel is not impaired).	EA		
*** {Severity L}			

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**03.02 EXTERIOR DOOR**

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**COMPONENTS (Continued)**

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**◆ 03.02.09 EXTERIOR DOOR AUTOMATIC OPERATORS (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
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**\* Opener/Actuator Working Improperly (Continued):**

b.	Opener/actuator works but grinds, catches or otherwise displays signs of poor operation and operator/actuator travel is impaired (door/lock does not completely open or close).	EA	
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**\*\*\* {Severity H}**

c.	Opener/actuator does not work causing the door/lock to be inoperative	EA	1
----	--	----	---

**\*\*\* {Severity H}**

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**03.02 EXTERIOR DOOR**

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**COMPONENTS (Continued)**

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**◆ 03.02.10 EXTERIOR DOOR/FRAME FINISH**

Finishes are applied as a thin layer of coating to a substrate by brush, roller, sprayer, or other suitable method. The coating seals, protects, or provides the desired appearance.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Finish Damage:</b>			
(caused by impact damage, previous maintenance patching, insect/animal damage, water intrusion, exposure, etc.)			
Observation:			
a. Finish damage evidenced by mars, scratches, scuffs, fading, and discoloration.	SF		
*** {Severity L}			
b. Finish damage - peeling or missing, no exposure of substrate.	SF		
*** {Severity M}			
c. Finish material damage evidenced by exposure of substrate.	SF		
*** {Severity H}			

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**03.02 EXTERIOR DOOR**

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**COMPONENTS (Continued)**

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**◆ 03.02.11 EXTERIOR DOOR JOINT SEALER/CAULKING**

Joints around doors in exterior walls are filled with an elastic sealant which protects the joint from moisture penetration.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Sealant Damage:</b>			
(caused by impact damage, exposure, water intrusion, etc)			
Observation:			
a. Sealant deterioration evidenced by hardening.	LF		
*** {Severity L}			
b. Sealant deterioration evidenced by shrinking, cracking, or missing.	LF		
*** {Severity H}			

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## 03.02 EXTERIOR DOOR

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### REFERENCES

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1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
3. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
4. Means Illustrated Construction Dictionary, R. S. Means, 1994
5. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
6. Modern Carpentry, W. H. Wagner, The Goodheart-Wilcox Company, Inc., 1983
7. Condition Assessment Survey (CAS) Program, Deficiency Standards & Inspections Methods Manual, Vol. 4, Exterior Closures, Department of Energy, 1993
8. Automatic Swinging and Sliding Doors, Stanley Magic-Door, Division of The Stanley Works 1991
9. Automatic Sliding and Swinging Doors, Horton Automatics, Overhead Door Corporation of Texas, 1991
10. Condition Assessment Survey (CAS) Program, Deficiency Standards & Inspections Methods Manual, Vol. 4, Exterior Closures, Department of Energy, 1993
11. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
12. NASA Facilities Maintenance Handbook, NHB 8831.2, 1991



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**03.02 EXTERIOR DOOR**

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**LEVEL II KEY      GUIDE SHEET CONTROL NUMBER**

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1      GS-II 03.02.09-1

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**LEVEL III KEY      GUIDE SHEET CONTROL NUMBER**

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1      GS-III 03.02.09-1

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**LEVEL II INSPECTION METHOD GUIDE SHEET**

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**LEVEL II GUIDE SHEET - KEY NO. 1**

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**COMPONENT:** EXTERIOR DOOR AUTOMATIC OPERATORS**CONTROL NUMBER:** GS-II 03.02.09-1**Application**

This guide applies to investigation of improper operation of special use doors such as overhead, coiling, sectional, swung, revolving, rolling, darkroom, cold storage, and folding partitions and associated door hardware. Improper operation of the door/hardware may be due to impact damage, wear and/or use.

**Special Safety Requirements**

Inspections where this unique door hardware apply may present hazards in examining tracks, rollers, chains, cables, coil springs, pulleys and other special mechanical devices. Caution should be used in inspecting and operating these special doors and hardware.

**Inspection Action**

Results of LEVEL I inspection indicate a deficiency in door/hardware operation. Although LEVEL I inspection methodology is very useful for determining the operating condition, the LEVEL II inspection provides a more thorough analysis of the cause of malfunction. Inspection actions to be used to further assess the extent of the component defect include the following actions:

1. Operate door through full operating range several times.
2. Observe movement of rollers, chains, cables, spring, coils, pulleys, etc. to determine deficiency.
3. Modify information in Data Collection Device to reflect the condition observed through level II inspection.

**Special Tools and Equipment Requirements**

None

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**LEVEL II INSPECTION METHOD GUIDE SHEET**

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**LEVEL II GUIDE SHEET - KEY NO. 1 (Continued)**

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**COMPONENT:** EXTERIOR DOOR AUTOMATIC OPERATORS  
**CONTROL NUMBER:** GS-II 03.02.09-1

**Recommended Inspection Frequency**

There is no standard frequency prescribed for this component. The Level II inspection is activated by deficiencies observed during the Level I inspections.

**References**

1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
3. Fundamentals of Building Construction Materials and Methods, E. Allen, John Wiley & Sons, Second Edition, 1990
4. Means Illustrated Construction Dictionary, R. S. Means, 1994
5. Basic Construction Materials, Methods and Testing, T. W. Marotta, C. A. Herubin, P.E., Regents/Prentice Hall, Fourth Edition, 1993
6. Modern Carpentry, W. H. Wagner, The Goodheart-Wilcox Company, Inc., 1983
7. Condition Assessment Survey (CAS) Program, Deficiency Standards & Inspections Methods Manual, Vol. 4, Exterior Closures, Department of Energy, 1993

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**LEVEL III INSPECTION METHOD GUIDE SHEET**

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**LEVEL III GUIDE SHEET - KEY NO. 1**

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**COMPONENT:** EXTERIOR DOOR AUTOMATIC OPERATORS  
**CONTROL NUMBER:** GS-III 03.02.09-1

**Application**

This guide applies to investigation of improper operation of special use doors such as overhead, coiling, sectional, swung, revolving, rolling, darkroom, cold storage, and folding partitions and associated door hardware, controls, sensors, and switches. Improper door/hardware operation may be due to impact damage, wear and/or use and electrical deficiencies.

**Special Safety Requirements**

Inspections where this unique door hardware and electrical control mechanisms apply may present hazards in examining tracks, rollers, chains, cables, coil springs, pulleys and other special mechanical and electrical devices. Caution should be used in inspecting and operating these special doors, hardware, and electrical control devices.

**Inspection Action**

Level III inspection requires the expertise of an individual that is trained in the inspection and operation of the special use doors/hardware and electrical control systems to further assess the extent of the component defect.

1. Review facility data files (Operation & Maintenance Manuals) to determine manufacture and technical specification related to the component.
2. Analyze inspection data from Level I and II inspection, in conjunction with Operation & Maintenance Manuals, to determine whether further inspection should be performed, and if so, by in-house technical capabilities or manufacture's representative.
3. Order inspection to be completed to determine extent and cost associated with correcting the deficiency.

Level III inspection requires the expertise of an individual that is trained in the inspection and operation of the special use doors/hardware and electrical control systems.

**Special Tools and Equipment Requirements**

Electrical Testing Equipment as required.

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**LEVEL III INSPECTION METHOD GUIDE SHEET**

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**LEVEL III GUIDE SHEET - KEY NO. 1 (Continued)**

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**COMPONENT:** EXTERIOR DOOR AUTOMATIC OPERATORS  
**CONTROL NUMBER:** GS-III 03.02.09-1

**Recommended Inspection Frequency**

There is no standard frequency prescribed for this component. The Level III inspection is activated by deficiencies observed during the Level I and/or Level II inspections.

**References**

1. Means Illustrated Construction Dictionary, R. S. Means, 1994
2. Automatic Swinging and Sliding Doors, Stanley Magic-Door, Division of The Stanley Works 1991
3. Automatic Sliding and Swinging Doors, Horton Automatics, Overhead Door Corporation of Texas, 1991

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### 03.03 BUILDING EXTERIOR WINDOW

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#### DESCRIPTION

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Windows are a subsystem of the Building Exterior system. Exterior windows are an opening in a wall of a building to provide any or all of the following: natural light, natural ventilation, and vision. They must also provide protection against entry and the weather. To be satisfactory, windows must be durable, weathertight, reasonable in cost, readily installed, and, for many uses, attractive in appearance. The principal parts of window units include interior trim stool and apron, frame, sash, casing, screen, and storm sash.

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#### SPECIAL TOOL AND EQUIPMENT REQUIREMENTS

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No special tools are needed for the inspection of the windows, beyond the requirements listed in the Building Exterior Standard Tools Section.

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#### SPECIAL SAFETY REQUIREMENTS

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No special safety requirements are needed for the inspection of the windows, beyond the requirements listed in the Master Safety Plan and System Safety Section.

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#### COMPONENT LIST

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- ◆ 03.03.01 EXTERIOR WINDOW - METAL
- ◆ 03.03.02 EXTERIOR WINDOW - WOOD
- ◆ 03.03.03 EXTERIOR WINDOW - STORM METAL
- ◆ 03.03.04 EXTERIOR WINDOW - STORM WOOD
- ◆ 03.03.05 EXTERIOR WINDOW FRAME - METAL
- ◆ 03.03.06 EXTERIOR WINDOW FRAME - WOOD
- ◆ 03.03.07 EXTERIOR WINDOW HARDWARE
- ◆ 03.03.08 EXTERIOR WINDOW/FRAME FINISH
- ◆ 03.03.09 EXTERIOR WINDOW JOINT SEALANT/CAULKING

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#### RELATED SUBSYSTEMS

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Due to the related nature of the elements requiring inspection, the following DS/IM's should be reviewed for concurrent inspection activities.

- |       |                        |
|-------|------------------------|
| 03.01 | BUILDING EXTERIOR WALL |
| 03.02 | BUILDING EXTERIOR DOOR |
| 01.00 | BUILDING SUBSTRUCTURE  |

### 03.03 BUILDING EXTERIOR WINDOW

#### STANDARD INSPECTION PROCEDURE

The standard inspection procedure for this subsystem is a Level I visual inspection of the windows, augmented by a Level II inspection when required. Inspectors may be required to use ladders or similar devices to inspect window components above the inspector's line of vision. Another alternative is the use of binoculars to inspect windows above the level of the inspector's vision in cases where the use of a ladder is impractical or dangerous. The inspection should be carried out in order of presentation of the various components. Associated defects and observations are listed which will be presented in the inspector's Data Collection Device (DCD).

#### COMPONENTS

##### ◆ 03.03.01 EXTERIOR WINDOW - METAL

Metals used for window construction are aluminum, steel, bronze, and stainless steel.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* Surface Damage:			
(caused by impact damage, previous maintenance patching, animal damage, water intrusion, etc.)			
Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on window.		SF	
*** {Severity L}			
b. Surface material damage evidenced by dents, depression, splitting of window.		SF	
*** {Severity M}			
c. Surface material damage evidenced by holes, cracks, delamination, loose surface material, and material deterioration.		SF	
*** {Severity H}			

## 03.03 BUILDING EXTERIOR WINDOW

### COMPONENTS (Continued)

#### ◆ 03.03.01 EXTERIOR WINDOW - METAL (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Corrosion:</b>			
(caused by water damage, etc.)			
Observation:			
a. Surface deterioration (no pitting evident).	SF		
*** {Severity L}			
b. Deterioration evidenced by pitting, or blistering.	SF		
*** {Severity M}			
c. Deterioration evidenced by holes or loss of metal.	SF		
*** {Severity H}			

#### Defect:

<b>* Glass Damage:</b>			
(caused by impact damage, exposure, etc)			
Observation:			
a. Damage evidenced by fading	SF		
*** {Severity L}			
b. Damage evidenced by cracks.	SF		
*** {Severity M}			
c. Glass damage evidenced by missing or broken with holes.	SF		
*** {Severity H}			
d. Deteriorated or missing glazing	SF		
*** {Severity H}			



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**03.03 BUILDING EXTERIOR WINDOW**

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**COMPONENTS (Continued)**

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**◆ 03.03.01 EXTERIOR WINDOW - METAL (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
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**\* Defective Operation:**

(caused by impact damage, wear,  
finish and use)

Observation:

a. Finish (painting) has made window      SF  
inoperable.

\*\*\* {Severity L}

b. Impact damage or wear makes window      SF  
difficult to operate.

\*\*\* {Severity M}

c. Impact damage or wear prevents      SF  
window from operating (opening/closing).

\*\*\* {Severity H}

**\* Screen Damage:**

(caused by impact damage, use,  
animal damage, etc.)

Observation:

a. Screen damage evidenced by bent,      SF  
snags or scratches.

\*\*\* {Severity L}

b. Screen damage evidenced by      SF  
missing, holes, torn, or loose.

\*\*\* {Severity H}

### 03.03 BUILDING EXTERIOR WINDOW

#### COMPONENTS (Continued)

#### ◆ 03.03.02 EXTERIOR WINDOW - WOOD

Wood windows are used extensively in many types of buildings when not excluded by the fire-resistive requirements of building codes.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Surface Damage:</b> (caused by impact damage, previous maintenance patching, insect/animal damage, water intrusion, etc.) Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on window.	SF		
*** {Severity L}			
b. Surface material damage evidenced by dents, depression, splitting of window.	SF		
*** {Severity M}			
c. Surface material damage evidenced by holes, cracks, delamination, loose surface material, and material deterioration.	SF		
*** {Severity H}			

#### Defect:

* <b>Glass Damage:</b> (caused by impact damage, exposure, etc) Observation:			
a. Damage evidenced by fading.	SF		
*** {Severity L}			
b. Damage evidenced by cracks.	SF		
*** {Severity M}			
c. Damage evidenced by missing or broken with holes.	SF		
*** {Severity H}			
d. Deteriorated or missing glazing.	SF		
*** {Severity H}			

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### 03.03 BUILDING EXTERIOR WINDOW

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#### COMPONENTS (Continued)

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#### ◆ 03.03.02 EXTERIOR WINDOW - WOOD (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
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**\* Defective Operation:**

(caused by impact damage, wear, swelling, finish and use)

Observation:

a. Finish (painting) has made window inoperable. SF

\*\*\* {Severity L}

b. Swelling has made window inoperable. SF

\*\*\* {Severity L}

c. Impact damage or wear makes window difficult to operate. SF

\*\*\* {Severity M}

d. Impact damage or wear prevents window from operating (opening/closing). SF

\*\*\* {Severity H}

**Defect:**

**\* Screen Damage:**

(caused by impact damage, use, animal damage, etc.)

Observation:

a. Screen damage evidenced by bent, snags or scratches. SF

\*\*\* {Severity L}

b. Screen damage evidenced by missing, holes, torn, or loose. SF

\*\*\* {Severity H}

### 03.03 BUILDING EXTERIOR WINDOW

#### COMPONENTS (Continued)

#### ◆ 03.03.03 EXTERIOR WINDOW - STORM METAL

During the winter months screens are often replaced with storm windows which have glass panels. Windows may be equipped with either clip-on storm panels or an external combination frame which holds both storm windows and screens.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* Surface Damage:			
(caused by impact damage, previous maintenance patching, Water intrusion, etc.)			
Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on storm.	SF		
*** {Severity L}			
b. Surface material damage evidenced by dents, depression on storm.	SF		
*** {Severity M}			
c. Surface material damage evidenced by holes, cracks, delamination, loose surface material.	SF		
*** {Severity H}			

#### Defect:

* Corrosion:			
(caused by water damage, etc.)			
Observation:			
a. Surface deterioration (no pitting evident).	SF		
*** {Severity L}			
b. Deterioration evidenced by pitting, or blistering.	SF		
*** {Severity M}			
c. Deterioration evidenced by holes or loss of metal.	SF		
*** {Severity H}			

### 03.03 BUILDING EXTERIOR WINDOW

#### COMPONENTS (Continued)

#### ◆ 03.03.03 EXTERIOR WINDOW - STORM METAL (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
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##### \* Glass Damage:

(caused by impact damage, exposure, etc)

Observation:

- |  |    |  |  |
|--|----|--|--|
| a. Damage evidenced by fading.                             | SF |  |  |
| *** {Severity L}   |    |  |  |
| b. Damage evidenced by cracks.                             | SF |  |  |
| *** {Severity M}   |    |  |  |
| c. Glass damage evidenced by missing or broken with holes. | SF |  |  |
| *** {Severity H}   |    |  |  |
| d. Deteriorated or missing glazing.                        | SF |  |  |
| *** {Severity H}   |    |  |  |

Defect:

##### \* Defective Operation :

(caused by impact damage, wear, finish and use)

Observation:

- |  |    |  |  |
|--|----|--|--|
| a. Finish (painting) has made window inoperable.                           | SF |  |  |
| *** {Severity L}   |    |  |  |
| b. Impact damage or wear makes window difficult to operate.                | SF |  |  |
| *** {Severity M}   |    |  |  |
| c. Impact damage or wear prevents window from operating (opening/closing). | SF |  |  |
| *** {Severity H}   |    |  |  |

Defect:

##### \* Screen Damage:

(caused by impact damage, use, animal damage, etc.)

Observation:

- |   |    |  |  |
|---|----|--|--|
| a. Screen damage evidenced by bent, snags or scratches.       | SF |  |  |
| *** {Severity L}  |    |  |  |
| b. Screen damage evidenced by missing, holes, torn, or loose. | SF |  |  |
| *** {Severity H}  |    |  |  |

### 03.03 BUILDING EXTERIOR WINDOW

#### COMPONENTS (Continued)

#### ◆ 03.03.04 EXTERIOR WINDOW - STORM WOOD

During the winter months screens are often replaced with storm windows which have glass panels. Windows may be equipped with either clip-on storm panels or an external combination frame which holds both storm windows and screens.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Surface Damage:</b> (caused by impact damage, previous maintenance patching, insect/ animal damage, water intrusion, etc.) Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on storm.	SF		
*** {Severity L}			
b. Surface material damage evidenced by depression, splitting of storm.	SF		
*** {Severity M}			
c. Surface material damage evidenced by holes, cracks, delamination, loose surface material, and material deterioration.	SF		
*** {Severity H}			

#### Defect:

* <b>Glass Damage:</b> (caused by impact damage, exposure, etc) Observation:			
a. Damage evidenced by fading.	SF		
*** {Severity L}			
b. Damage evidenced by cracks.	SF		
*** {Severity M}			
c. Glass damage evidenced by missing or broken with holes.	SF		
*** {Severity H}			
d. Deteriorated or missing glazing.	SF		
*** {Severity H}			

### 03.03 BUILDING EXTERIOR WINDOW

#### COMPONENTS (Continued)

#### ◆ 03.03.04 EXTERIOR WINDOW - STORM WOOD (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
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**\* Defective Operation :**

(caused by impact damage, wear, swelling, finish and use)

Observation:

a. Finish (painting) has made window inoperable. SF

\*\*\* {Severity L}

b. Swelling has made window inoperable. SF

\*\*\* {Severity L}

c. Impact damage or wear makes window difficult to operate. SF

\*\*\* {Severity M}

d. Impact damage or wear prevents window from operating (opening/closing). SF

\*\*\* {Severity H}

**Defect:**

**\* Screen Damage:**

(caused by impact damage, use, animal damage, etc.)

Observation:

a. Screen damage evidenced by bent, snags or scratches. SF

\*\*\* {Severity L}

b. Screen damage evidenced by missing, holes, torn, or loose. SF

\*\*\* {Severity H}

### 03.03 BUILDING EXTERIOR WINDOW

#### COMPONENTS (Continued)

#### ◆ 03.03.05 EXTERIOR WINDOW FRAME - METAL

Frames retain the windows, anchor the hardware, and present a finished appearance by forming a transition between the window and the wall. Metal frames may be supplied in various gauges of galvanized or plain steel in knockdown standard frames or welded customized frames that can be fabricated to satisfy most design conditions. Frames may be wrap around (enclosing the wall) or butt up against the opening. Frames are normally reinforced at stress points and are prepared for hardware. Frames are attached to the walls with anchors which are supplied to suit the wall construction requirements.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* Surface Damage:			
(caused by impact damage, previous maintenance patching, water intrusion, etc.)			
Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on frame.	LF		
*** {Severity L}			
b. Surface material damage evidenced by dents and depression on frame.	LF		
*** {Severity M}			
c. Surface material damage evidenced by holes, delamination, loose surface material, joint separation.	LF		
*** {Severity H}			

#### Defect:

* Corrosion:			
(caused by water damage, etc.)			
Observation:			
a. Surface deterioration (no pitting evident).	LF		
*** {Severity L}			
b. Deterioration evidenced by pitting, or blistering.	LF		
*** {Severity M}			
c. Deterioration evidenced by holes or loss of metal.	LF		
*** {Severity H}			



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**03.03 BUILDING EXTERIOR WINDOW**

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**COMPONENTS (Continued)**

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**◆ 03.03.05 EXTERIOR WINDOW FRAME - METAL (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Misalignment:</b>			
(caused by impact damage, use, building settlement, etc.)			
Observation:			
a. Noticeable misalignment, not allowing the window to open or close.	LF		
*** {Severity H}			

### 03.03 BUILDING EXTERIOR WINDOW

#### COMPONENTS (Continued)

#### ♦ 03.03.06 EXTERIOR WINDOW FRAME - WOOD

Frames support the windows, anchor the hardware, and present a finished appearance by forming a transition between the window and the wall. Wood frames are made of various species that complement the window and the interior/exterior finish. Frames may be wrap around (enclosing the wall) or butt up against the opening. Frames are normally reinforced at stress points and are prepared for hardware. Frames are attached to the walls with anchors which are supplied to suit the wall construction requirements.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* <b>Surface Damage:</b> (caused by impact damage, previous maintenance patching, insect/animal damage water intrusion, etc.) Observation:			
a. Surface damage evidenced by mars, scratches, or scuffs on frame.	LF		
*** {Severity L}			
b. Surface material damage evidenced by splits and depression on frame.	LF		
*** {Severity M}			
c. Surface material damage evidenced by holes, delamination, loose surface material, joint separation.	LF		
*** {Severity H}			

#### Defect:

* <b>Misalignment:</b> (caused by impact damage, use, building settlement, etc.) Observation:			
a. Noticeable misalignment, not allowing the window to open or close.	LF		
*** {Severity H}			

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### 03.03 BUILDING EXTERIOR WINDOW

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#### COMPONENTS (Continued)

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#### ◆ 03.03.07 EXTERIOR WINDOW HARDWARE

Hardware is mounted to windows and frames to facilitate hanging, operating, closing, locking, sealing, or protecting.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
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**\* Defective Operation:**

(caused by impact damage, wear, and use)

Observation:

a. Window hardware operates poorly (sticks, hard to turn, etc)	EA		
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\*\*\* {Severity M}

b. Fails to perform intended operation (window doesn't fasten, lock, or open).	EA		
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\*\*\* {Severity H}

**Defect:**

**\* Physical Damage:**

(caused by impact damage, wear, and use)

Observation:

a. Loose, worn, or misaligned. Requires tightening or adjusting.	EA		
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\*\*\* {Severity L}

b. Broken or missing.	EA		
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\*\*\* {Severity H}

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**03.03 BUILDING EXTERIOR WINDOW**

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**COMPONENTS (Continued)**

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**◆ 03.03.08 EXTERIOR WINDOW/FRAME FINISH**

Finishes are applied as a thin layer of coating to a substrate by brush, roller, sprayer, or other suitable method. The coating seals, protects, or provides the desired appearance.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Finish Damage:</b>			
(caused by impact damage, previous maintenance patching, insect/animal damage, water intrusion, exposure, etc.)			
Observation:			
a. Finish damage evidenced by mars, scratches, scuffs, fading, and discoloration.	SF		
*** {Severity L}			
b. Finish damage - peeling or missing, no exposure of substrate.	SF		
*** {Severity M}			
c. Finish material damage evidenced by exposure of substrate.	SF		
*** {Severity H}			

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**03.03 BUILDING EXTERIOR WINDOW**

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**COMPONENTS (Continued)**

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**◆ 03.03.09 EXTERIOR WINDOW JOINT SEALER/CAULKING**

Joints around window in exterior walls are filled with an elastic sealant which protects the joint from moisture penetration.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Sealant Damage:</b>			
(caused by impact damage, exposure, water intrusion, etc)			
Observation:			
a. Sealant deterioration evidenced by hardening of sealant/caulking.	LF		
*** {Severity L}			
b. Sealant deterioration evidenced by shrinking, cracking, or missing.	LF		
*** {Severity H}			

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### 03.03 BUILDING EXTERIOR WINDOW

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#### REFERENCES

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1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
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**03.03 BUILDING EXTERIOR WINDOW**

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**LEVEL II KEY                      GUIDE SHEET CONTROL NUMBER**

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N/A

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**LEVEL III KEY                      GUIDE SHEET CONTROL NUMBER**

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N/A

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## 03.04 BUILDING EXTERIOR SPECIALTIES

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### DESCRIPTION

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Building exterior specialties includes a number of penetrations and architectural features which occur on the exterior of a facility. They include venting devices, flashings, decorative items, soffit/facia, and related architectural features.

### SPECIAL TOOL AND EQUIPMENT REQUIREMENTS

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No special tools are needed for the inspection of the exterior specialties, beyond the requirements listed in the Building Exterior Standard Tools Section.

### SPECIAL SAFETY REQUIREMENTS

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No special safety requirements are needed for the inspection of the exterior specialties, beyond the requirements listed in the Master Safety Plan and System Safety Section.

### COMPONENT LIST

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- ◆ 03.04.01 LOUVER/GRILLE/SCREEN/VENTS
- ◆ 03.04.02 SOFFIT/FACIA
- ◆ 03.04.03 FLASHING
- ◆ 03.04.04 ARCHITECTURAL FEATURES
- ◆ 03.04.05 LINTELS

### RELATED SUBSYSTEMS

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Due to the related nature of the elements requiring inspection, the following DS/IM's should be reviewed for concurrent inspection activities.

- |       |                          |
|-------|--------------------------|
| 03.01 | BUILDING EXTERIOR WALL   |
| 03.02 | BUILDING EXTERIOR DOOR   |
| 03.03 | BUILDING EXTERIOR WINDOW |
| 02.00 | BUILDING SUPERSTRUCTURE  |
| 04.00 | BUILDING ROOF            |
| 08.00 | BUILDING MECHANICAL      |
| 10.00 | BUILDING ELECTRICAL      |

### STANDARD INSPECTION PROCEDURE

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The standard inspection procedure for this subsystem is a Level I visual inspection of the specialty items, augmented by a Level II inspection when required. Inspectors may be required to use ladders or similar devices to inspect components above the inspector's line of vision. Another alternative is the use of binoculars to inspect above the level of the inspector's vision in cases where the use of a ladder is impractical or dangerous. The inspection should be carried out in order of presentation of the various components. Associated defects and observations are listed which will be presented in the inspector's Data Collection Device (DCD).



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## 03.04 BUILDING EXTERIOR SPECIALTIES

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### COMPONENTS

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#### ◆ 03.04.01 LOUVER/GRILLE/SCREEN/VENTS

Exterior Louver/Grille/Screen Vents are constructed of sloping, closely spaced slates, or wire mesh used to diffuse air or prevent the entry of undesirable objects, insects, animals or rainwater etc., into a ventilating opening such as air intake/exhaust, HVAC system, exhaust hoods, dryer vents etc. The primary materials used in the construction of Louvers/Grilles/Screens are metal, wood, plastic and combinations of these materials.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Surface Damage:</b>			
(caused by impact damage, insect/animal damage, exposure, water intrusion, etc)			
Observation:			
a. Surface damage evidenced by mars, scratches, blistering or loose material.	SF		
*** {Severity L}			
b. Surface material damage evidenced by dents, depression, splitting.	SF		
*** {Severity H}			
c. Surface material damage evidenced by missing or broken material.	SF		
*** {Severity H}			

## 03.04 BUILDING EXTERIOR SPECIALTIES

### COMPONENTS (Continued)

#### ◆ 03.04.02 SOFFIT/FACIA

Soffit/Facia are elements of the exposed overhang or eave of a building. The underside of the overhang or eave is referred to as the Soffit, while the vertical face of the overhang or eave is referred to as the Facia. The materials used in constructing Soffits/Fascia includes wood, metal, vinyl.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* Surface Damage:			
(caused by impact damage, insect/animal damage, exposure, water intrusion, etc)			
Observation:			
a. Surface damage evidenced by mars, scratches, loose material.	SF		
*** {Severity L}			
b. Surface damage evidenced by stains, graffiti.	SF		
*** {Severity L}			
c. Surface material damage evidenced by dents, depression, splitting joint separation	SF		
*** {Severity M}			
d. Surface material damage evidenced by holes, cracks, loose, missing or misaligned surface material, and material deterioration.	SF		
*** {Severity H}			
e. Trim damage evidenced by loose, missing or deteriorated material.	LF		
*** {Severity H}			

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**03.04 BUILDING EXTERIOR SPECIALTIES**

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**COMPONENTS (Continued)**

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**◆ 03.04.03 FLASHING**

Flashing is a continuous sheet of thin, impervious material that is used as a barrier against the passage of water or moisture. Flashings may be made of sheet metal, plastics, or composite materials and are commonly used at corners and junctions of building materials and construction features where flashing is normally required such as roof edges, wall recess or projection, sill, head, lintel and wall base.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Material Damage:</b>			
(caused by impact damage, previous maintenance patching, exposure, water damage)			
Observation:			
a. Material damage evidenced by dents, corrosion, joint deterioration, or misalignment which may allow water intrusion.	SF		
*** {Severity M}			
b. Material damage evidenced by holes, cracked, deteriorated or missing flashing allowing water intrusion.	SF		
*** {Severity H}			

## 03.04 BUILDING EXTERIOR SPECIALTIES

### COMPONENTS (Continued)

#### ◆ 03.04.04 ARCHITECTURAL FEATURES

Architectural Features consist of ornamental, decorative or other fine architectural detail that is displayed prominently on the exterior of the building to define, accent or compliment the overall architectural style of the building. Architectural features are generally constructed, carved, sculpted or manufactured from wood, stone, metal, glass or plastic.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* Surface Damage:			
(caused by impact damage, previous maintenance patching, insect damage, exposure, water damage)			
Observation:			
a. Surface damage evidenced by mars, dents, corrosion.	EA		
*** {Severity L}			
b. Surface damage evidenced by stains, graffiti.	EA		
*** {Severity L}			
c. Material damage evidenced by holes, cracks, loose, missing material, and material deterioration.	EA		
*** {Severity H}			

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**03.04 BUILDING EXTERIOR SPECIALTIES**

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**COMPONENTS (Continued)**

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**◆ 03.04.05 LINTELS**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
<b>* Material Damage:</b>			
Observation:			
a. Material damage evidenced by dents, corrosion, joint deterioration, or misalignment which may allow water intrusion.	LF		
*** {Severity M}			
b. Material damage evidenced by holes, cracked, deteriorated or missing flashing allowing water intrusion.	LF		
*** {Severity H}			

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## 03.04 BUILDING EXTERIOR SPECIALTIES

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### REFERENCES

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1. Building Construction Materials and Types of Construction, D. C. Ellison, W. C. Huntington, R.E. Mickadeit, John Wiley & Sons, Inc., Sixth Edition, 1987
2. Construction Principles, Materials & Methods, H. B. Olin, A.I.A., Interstate Printers and Publishers, Inc. Fifth Edition, 1983
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**03.04 BUILDING EXTERIOR SPECIALTIES**

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**LEVEL II KEY                      GUIDE SHEET CONTROL NUMBER**

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N/A

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**LEVEL III KEY                      GUIDE SHEET CONTROL NUMBER**

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N/A

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**APPENDIX A**

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**ABBREVIATIONS**

CAS	Condition Assessment Survey (System)
DCD	Data Collection Device (Equipment)
DS/IM's	Deficiency Standards/Inspection Methods
EA	Each
Field Cais	Condition Assessment Information Survey (Program) Used in gathering and conditioning data prior to processing
H	Severity "H" = High Impact on Condition Index
IU	Inspection Unit (Refer to "Inspector's Guide")
L	Severity "L" = Low Impact on Condition Index
LF	Linear Foot
M	Severity "M" = Medium Impact on Condition Index
MAT'L	Material
SF	Square Foot
Site Cais	Condition Assessment Information Survey (Program) Used in processing assessment data
UOM	Unit of Measure
W/	With
>	Greater Than
<	Less Than
'	Foot or Feet
"	Inch or Inches



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## APPENDIX B

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### GLOSSARY

CRACKING	A defect of concrete or masonry constructions wherein the base material separates opening a small linear opening at joints or directly through the material mass.
DELAMINATION	This defect consists of a separation of layers of various construction materials similar to wood, or plastics etc. Numerous conditions can cause this separation but moisture is the most common cause.
EFFLORESCENCE	This defect is recognized by whitish or light grey mineral deposits on the surface of concrete and masonry constructions. It is created by moisture entering the construction and getting behind the material. From this point it leaches through the material carrying with it dissolved salts and other minerals which deposit on the surface of the construction when the moisture carrying it evaporates at that surface. This type of defect indicates a lack or failure of a moisture seal or barrier.
FAULT	This defect is similar to a "crack" as explained above but is characterized a being much larger in width, and usually following a natural seam or joint in the construction.
GOUGE	A gouge is similar to scratch except it is deeper and wider with the possibility individual areas of major loss of the construction material effected.
IMPROPER SLOPE	Improper slope refers to roof drainage gutters and roof leaders or lateral conductors, where the angle of slope determines the rate of water flow. In some cases slope is so poor or even negative so as to cause standing water in the gutter etc. or overflow.
ROOF LEADER	In some cases roofs are sloped or contoured so as to carry collected water drainage to a point where it is then conducted to a downspout or roof drain. In the case of a downspout a roof leader is used for this purpose.
SCRATCHES	This defect describes individual linear intrusions into the surface of the construction in question. This is common to all finishes and multiple types of materials, including wood, plastics, metal etc. This term is used to describe a individual defect that is not excessively deep and of a separate nature.
SCUFFS	This defect is evidenced by multiple small, shallow and short scratches all parallel to each other and confined to a relative small surface area of the construction material involved.

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**APPENDIX B**

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**SPALLING**

A defect of concrete or masonry constructions wherein small pieces of the surface layers of the mass break away from the remaining mass creating shallow voids usually along the edge of the construction.

**SUBSTRATE**

Substrate refers to the base material over or to which a finished component or final finish material is applied.

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**APPENDIX C**

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**LIFE CYCLES****03 BUILDING EXTERIOR****03.01 EXTERIOR WALL**

Exterior Wall	
Concrete	75 YRS
Masonry	75 YRS
Glass Block	50 YRS
Stud Framing	30 YRS
Glazed Curtain	50 YRS
Exterior Surface	
Metal	50 YRS
Wood	30 YRS
Vinyl	25 YRS
Hardboard	15 YRS
Tile	40 YRS
Plaster	30 YRS
Shingles	15 YRS
Asbestos Treatment	25 YRS
Exterior Finish	
Paint/Stain	5 YRS
Exterior Joint	
Sealer/Caulking	3 YRS
Roof Drainage System	15 YRS

Source:

MEANS Facilities Maintenance &amp; Repair Cost Data, 1994

**03.02 EXTERIOR DOOR**

Exterior Door	
Metal	30 YRS
Wood	25 YRS
Glass	30 YRS
Overhead	20 YRS
Hardware	20 YRS
Automatic Operators	12 YRS
Exterior Frame	
Metal	20 YRS
Wood	12 YRS
Finish	5 YRS
Joint Sealer/Caulking	3 YRS

Source:

MEANS Facilities Maintenance &amp; Repair Cost Data, 1994

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**APPENDIX C**

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**03.03 EXTERIOR WINDOW**

Exterior Window	
Metal	30 YRS
Wood	25 YRS
Hardware	20 YRS
Joint Sealer/Caulking	3 YRS
Exterior Storm	
Metal	30 YRS
Wood	25 YRS
Exterior Frame	
Metal	20 YRS
Wood	15 YRS
Finish	5 YRS

Source:

MEANS Facilities Maintenance & Repair Cost Data, 1994

**03.04 EXTERIOR-SPECIALTIES**

Louvers/Grills/Screen/Vents	12 YRS
Soffit/Facia	20 YRS
Flashing	15 YRS
Architectural Features	20 YRS
Lintels	40 YRS

Source:

MEANS Facilities Maintenance & Repair Cost Data, 1994